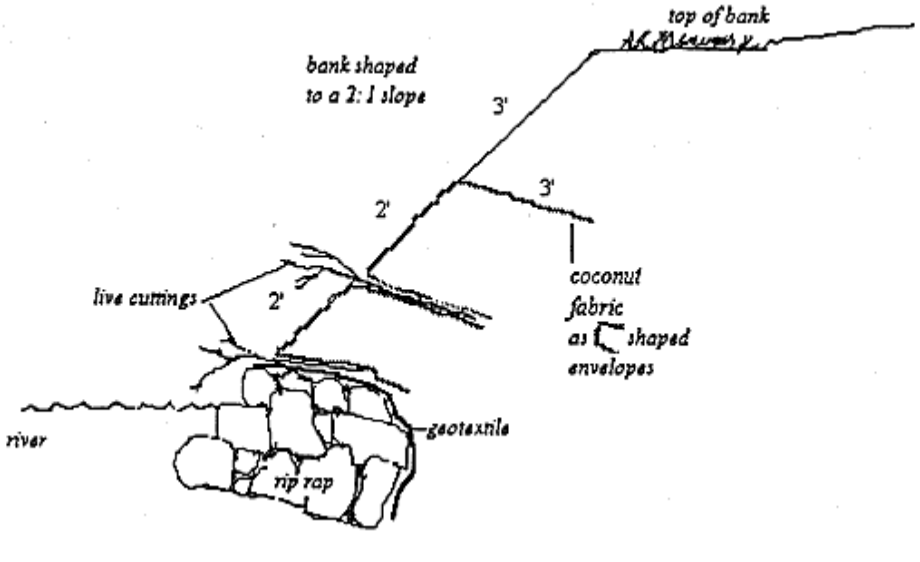
PROBLEMS WITH STREAMBANK DESIGN

Anyone who has tried to build castles in the sand might appreciate the problems encountered by BRASS last year when restoring two streambanks. One 300-foot stretch was on a horse farm owned by Charles and Karen Keene in Whallonsburg, the other 300-foot reach was at the Jerrold Sherman farm in Westport. Both properties had badly eroded, very sandy, 8-foot tall embankments. Both landowners either had already fenced, or agreed to fence, livestock from the river so trees and shrubs could later be planted as a buffer zone.

Log cribs were out of the question as a restoration design, since there were no stable upstream and downstream embankments to tie into. Besides, the whole trend in restoration is toward "bio-engineering," or using vegetation in ways that will restore the bank to its prior natural condition. Because shaping and vegetating steep sandy banks has not proven very successful on the Boquet in the past, BRASS wanted to try a new design, one suggested by a river restoration company in Montana with a 12-year history of "bio-engineering" projects. (Mid-way through the projects, BRASS received a similar design in the new chapter of the USDA/NRCS Engineering Field Handbook. The general idea is excavation of an eroded bank, placement of stone rip rap at the "toe" area, then building back the bank at a 2:1 slope in layers or "lifts" of soil "enveloped" in erosion control fabric. Between each soil lift, live cuttings are placed.



Grant money did not allow rip rap placement on all 600 l.f., so we placed rock only on bend sections. A contractor (John Sheehan & Sons) was hired for excavation and placement of the stone donated by NYCO. Live cuttings and rooted

bush willows were cut and dug from the nursery NRCS established at the Cornell experimental farm in Willsboro. Geotextile fabric was purchased to place in between the stone and the bank so soil could not fill or displace the rip rap.

Then BRASS purchased two different kinds of biodegradable "coir" fabric (woven rolls of coconut fiber) as the envelope material for the soil lifts: CocoMat 9 from New England Geotextiles Company @ $3.30/sy plus shipping; and EroMat V125C @ $1.50/sy plus shipping from Erosion Control Technologies. We were curious about performance and price differences.

Next came the tricky part, turning a design into reality. The first problem was timing. You can't place rip rap at the toe of banks when the water is high if you don't have the money for a substantial coffer dam. So, we waited until mid summer and low water.

With the rock in place, we installed geotextile fabric, spread out part of the cuttings and rooted willows, and rolled out the coconut fiber above the willows. We had to roll it out into the river, as there was no other place. (Our rolls were 8-feet wide and over 125-feet long. Three feet of the width is placed in the bank, the rest of the fabric ultimately gets rolled up and over the first constructed soil lift with 2-feet becoming the face of the bank, and the remaining 3-feet buried back into the bank.) We had 5-feet of fabric that needed to be kept out of the way during construction of the soil lift. The coconut fiber rolls weigh over 60 lbs. when dry. When wet they are a real struggle. When wet you realize why you need to purchase the more expensive version; the tensile strength of the cheaper coir fabric was totally insufficient.

Of course, when you wait for hot dry weather and low water, you get hot dry sand. Ever build a sand castle with hot dry sand? You pack it in a pail, carry it to your sight, turn the pail over, and you have a loose mound of sand sliding everywhere. That is what happened when we tried to create soil lifts. The sand slid and slid. The machine bucket tried to pack it in place (while we said goodby to the mashed rooted willows under the coir fabric). When the sand was moist, it would somewhat pack but become loose again when shaped for the 2:1 slope. A few times the sand was wet enough to pack and shape, but then the surface was similar to a hard glaze. We couldn't get grass seed to stick or sink into the soil. Scratching small furrows with a rake only crumbled the embankment.

When we pulled the fabric up to cover the soil lifts, not only was it wet and heavy (or ripped), we couldn't get that nice smooth appearance of the design. As sand loosened, the fiber mat bulged and sagged, giving us very uneven envelope. We resorted to hardwood stakes to make sure the fabric was secure.

Despite all the problems, both banks somehow came out looking good by the end of the projects. We took photos and patted ourselves on the back. Miraculously we did not have a bad "ice out" this spring; nor were there floods. But both banks

suffered some erosion over the winter and spring. At both project sites you could see pulled out and loosened fabric. Damage could have been caused by river debris. Several enormous logs were left by high water on top of the Keene streambank. Or, perhaps BRASS learned a valuable lesson: don't attempt this type of design on a sandy streambank. For, although BRASS has been fairly successful obtaining funds for streambank projects, grants have a definite time period and there are no funds for repairs.

Tips to Other River Associations:

- If you are shaping a 2:1 slope, plan where excess bank soil will go. (The Keenes used sand for their riding rink and septic field; the Shermans used sand for barn bedding material.)
- Do not use rooted plants under the soil lifts.
- Try to obtain from manufacturers tensile strength specifications on fabrics to be used as soil envelopes.
- Have lots of people available to lift the fabric.
- Have hardwood stakes available for emergencies.
- Plan on purchasing top soil for the soil lifts, if the bank is tall and composed of mostly sand.
- Try to get funds for future repair work.
- Don't expect no castle!