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## **River Rehabilitation Work in Dry Tropical Environments (Mexico)**

*Skye (Mexico)*

*[Submitted Paper]*

The Rio Laja has a massive catchment area in the high-altitude, dry tropical part of Mexico known as the Bajio. For eleven months of the year it is a dry, wide and gravelly river bed. When the summer rains (av. 400mm) do come, the catchment, denuded of vegetation and often soil (by centuries of overgrazing by the donkeys, goats and sheep introduced by the Spanish and by the forest removal needed to smelt silver to keep Europe of the seventeenth century financially afloat) runs wildly with silt laden run-off. Overnight the river becomes a raging flood capable of destructive erosion.

With little to hold any moisture (both soil and vegetation are largely non-existent) the flood is quickly followed by months of drought. During this time the women collect water from small holes dug into the stony river bed, using plastic cups as they lie on the hot bare rocks. For some women of Pena Blanca it may take hours of walking, digging and careful slow collection to gather sufficient water for the families daily cooking and washing needs.

This area is also a major stop on the migratory flight path of many of the species of bird that move between the Northern and Southern continents of the Americas. For this reason the San Miguel de Allende chapter of the Audobon Society was able to obtain funding to employ the services of Bill Zeedyk, a retired engineer from the Californian Forests and Wildlife Service.

Bill understands the dynamics and forces involved in the massive floods of this type of dryland river system. The locally-traditional "pressas filtrates" (dry stone dam walls) would be swept away with the first major rain event, while steel-encased gabions or major concrete flood control systems are simply beyond the resource possibilities of the region. However rock dams, only one rock high will sit underneath the flood and quietly collect silt and organic material. These lowly structures are one rock high and eight rocks deep (across the stream flow direction). Once they have collected silt one year, another "one rock dam" can be built slightly upstream of it. Within a few years a great deal of moisture-retaining silt will be accumulated.

In conjunction with this collection of silt, it is important that the river system be lengthened. Fairly simple mathematics shows that by increasing the length of the river by 20%, the speed of the water in flood will be reduced by half, and that the size of the rocks that can be moved (ie the erosion capability) will be reduced to one eighth. To accomplish this, Bill works with the shape of the river and builds “deflector banks” on the inside of existing curves in the river. Again these are only one rock high. Where possible both of these types of structures are enhanced with appropriate planting – in this case Bill used the local “seep willow” as it was the only thing surviving in the river system, obviously the only thing the goats did not eat!

Bill worked with the local school children of the community of Pena Blanca, and also with workers from local community support groups within the area, CASA and Fundacion A Infantiles. After the rains of 1996 almost all of the built structures survived the heavy flooding and performed well. Bill is returning in November to follow-up on his fine work, and will soon publish a book on the subject. As a strategy for saving and rebuilding damaged river systems and their local communities and habitats the system Bill Zeedyk has developed is certainly effective, relevant and cost efficient. I recommend anyone working with this type of river system to seek out Bill’s book as soon as it is published. The work of Bill Zeedyk is another tool that every serious permaculturist needs to be aware of.