

# Geoweb® System Shoreline Restoration

CASE STUDY



## The Problem:

The city pond in the town of Wamego, Kansas was suffering from years of sediment buildup from shoreline erosion, causing the once beautiful focal point to become an eye-sore of muddy, stagnant water. The City was challenged with restoring the pond to its original state while including shoreline stabilization measures to protect against recurring erosion and sediment problems.

## The Solution:

Presto Geoweb® Cellular Confinement System



Presto's perforated Geoweb® cellular confinement system was specified to stabilize the shoreline's infill and protect against erosion. The design called for placing concrete in the Geoweb® system's lower half exposed to water contact to provide a hard-armored lining system and to avoid infill washout. Topsoil and sod were specified for the upper half to maintain the aesthetics of the shoreline.

Confining the two infill types in the perforated Geoweb® cellular structure has distinct benefits. The system confines, reinforces and restrains the vegetated layer. The system controls downslope movement due to hydrodynamic and gravitational forces, minimizing the formation of rills and gullies. Perforations allow better root lockup within the cell walls for a more stable vegetated system.

Concrete infill within the cells produces a durable lining system of uniform thickness, resistant to infill washout and the erosive effects from water contact. The Geoweb sections act as lightweight, flexible forms with built-in expansion joints. The concrete-filled system retains flexibility and the ability to conform to potential subgrade movement without loss of integrity. Perforations allow concrete to flow from cell to cell, creating superior lockup in the system's cells.

### Project

Wamego Shoreline Restoration

### City Engineer

Morris Crisler

### Engineering Consultant

InterSol Engineering

### Presto Distributor

ASP Enterprises

### Location

Wamego, Kansas

### Timeframe

Fall 1998



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# Presto Geoweb® Cellular Confinement System

## Benefits of the Geoweb®-Stabilized Shoreline:

- The system stabilizes topsoil, reducing suspended solids and improving water quality.
- The system reduces maintenance as workers can mow up to the water's edge; no weed eaters needed.
- The concrete's uniform, rough surface increases safety for the maintenance crew.
- The concrete system controls shoreline damage by geese, muskrats and other destructive wildlife.
- The system allows aquatic plant control.

## The Installation:

The pond was dredged with a backhoe, removing large amounts of red granite shoreline riprap added over time, and the bottom and side slopes graded. Twelve-foot wide 4 oz. non-woven geotextile was cut in half to form six-foot wide sections and placed around the shoreline perimeter. Two 51 mm x 102 mm (2 in x 4 in) wood templates were used to mark the placement of anchors in both the horizontal and vertical direction on the slope.

Geoweb sections, 2.44 m x 6.10 m x 102 mm (8 ft x 20 ft x 4 in), were expanded, laid longitudinally on the slope and positioned over the fabric underlayer so the Geoweb system's lower half covered the fabric. The geotextile layer beneath the concrete acts as a separation layer, keeping the cells free from dirt during the infill process.

The Geoweb sections were secured with ATRA™ Anchors and connected with a pneumatic stapler. Once the high and low water levels were determined, a string line marked the separation between the concrete and topsoil fills.

The infill process began with placing concrete in the lower section and raking the concrete flush with the top of the cell walls. As a cost-saving measure, excess concrete was donated from the local batch plant. "The concrete infill was placed to six inches above the high water line and six inches below the expected low water line," explains John Warren, CPESC 763, ASP Enterprises, Presto's distributor. "It's important to get the elevations correct." After the concrete was cured, topsoil was added in the upper portion and raked in the same manner as the concrete. Sod was finally placed over the topsoil and rolled.



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A rock garden effect is created by placing red granite within the concrete-filled system.



The drained pond prior to restoration.



Wood templates facilitate positioning of anchors.



Geoweb® sections are ready for infill placement.

To protect several large tree roots from foot traffic, concrete was extended further up the Geoweb sections in those areas. Honeysuckle bushes will be planted around the base of the trees to discourage fisherman in the protected areas. Some red granite was salvaged, cleaned and placed back within the system's concrete fill in specific locations, creating an attractive rock shoreline effect. Some sections were left void of concrete in lower, underwater areas, allowing cattails and other natural water plants to be planted, yet contained within the desired areas.



With the use of the Geoweb® system and local park labor, the City of Wamego was able to cost-effectively restore their city pond to a condition that was both functional and more attractive than the original shoreline.