



Applied Polymer Systems, Inc.

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Innovations

Bank Stabilization

Lake Independence Dam – Bank Stabilization, Big Bay, MI

Lake Independence is a natural lake made larger by the construction of the Lake Independence Dam. Located in Big Bay, Michigan on the Iron River, it was built in the 1930's as a generator for hydroelectric power. Although no longer used for power generation, it is maintained by the Marquette County Drain Commission in order to monitor and maintain water levels to preserve the value of waterfront properties.

Through the years, substantial erosion has been occurring along the banks adjacent to the dam. Sand bagging was the normal practice to prevent scouring and channelization around the dam. It was feared that should erosion continue, the water would eventually cut a path around the dam, rendering it useless, and essentially draining the lake. This would alter the ecosystem as well as severely diminish property values along the lake.



Erosion of the shoreline is clearly visible in the bank along the right side of this photograph. The dam is seen on the upper left-hand corner of the photo.



The photo to the left shows the geosynthetic fabric laid on the bank and the sand beginning to be deposited. The photo to the right shows the excess fabric being pulled over the sand and fortified with rock, forming a containment for the sediment.

After several failed proposals drawn up to rectify the situation, the Marquette County Drain Commission and the DEQ, a division of the Department of Natural Resources, issued Applied Polymer Systems permits to implement a bank stabilization system. It aimed at protecting the Lake Independence Dam, as well as stopping bank erosion to protect lakefront property. The general plan was to lay down a geosynthetic material, add sand and topsoil, fortify with medium sized rock, and then add a seed polymer mixture to stop erosion and establish vegetation as quickly as possible.



Left: Completed bank structure consisting of sand, rock, and top soil.

Right Top: Polymer, seed mix, mulch, and straw matrix spread over rock.
Right Bottom: Clear lake water directly below newly stabilized bank.

The area was cleared of tall grasses and shrubs, and wooden stakes were placed at the low water line to establish a boundary. A non-woven geosynthetic fabric was then laid across the slope with enough overlap so it could be pulled over the soon to be added sand/soil material, forming a containment and preventing the fine material from washing into the lake. Once the sand was brought in and the geosynthetic fabric stretched over it, medium sized rock was used to fortify the newly contoured bank.

Next, a mixture of seed, mulch, and polymer was added to the rock bank. Establishing vegetation in rock and sand is very difficult. This was achieved using a seed mix of clover, perennial rye, tall fescue, and millet. The clover was used to produce nitrogen without the use of fertilizers. A site tested polymer, APS 705 powder, was used to bind all the materials together with the soil to form a matrix, keep it in place, and allow for a vegetative cover to be established.

The project took about two weeks to complete and the different types of grasses came up from within 3 days to 2-3 weeks. After a year, in the following spring, the grass continued to grow once again.

Using environmentally friendly and natural materials, erosion was stopped, the dam was protected, and fears of dam failure around the lake have subsided. The results are visually pleasing and the water is crystal clear.

This is another example of how APS polymers in conjunction with other BMPs (Best Management Practices) can help protect water resources and property with very little construction activity and minimal impact.



The following spring the bank was visually appealing and permanent. Note the grass growing between the rocks and the clarity of the water seen in the reflection of the tree..

For product and distributor information
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