



Designed for Nature...Engineered for Life

Envirolok, LLC | www.envirolok.com | ecosolutions@envirolok.com

10101 N Casey Road Evansville, WI 53536 | 608.226.2565



STREAM/RIVERBANK RESTORATION

CASE STUDIES

+ ENGINEERED BANK RESTORATION

River and streambanks are complex. Soils along these waterways are subject to a variety of forces that can cause or accelerate erosion and instability. Traditional bank restoration practices focus either on hard armoring or bioengineered solutions. Envirolok combines the best principles of these two approaches to provide a permanent vegetative solution that will stabilize and protect even in the most challenging of conditions.

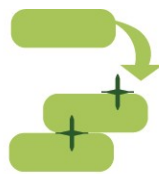
Envirolok is engineered to strengthen banks while improving aquatic and terrestrial habitats. With natural vegetation, Envirolok creates the opportunity for increased infiltration, reduced run-off, and minimizes the risk of pollutants reaching our waterways. Envirolok is flexible and easy to construct within a small footprint, making it ideal for projects of any slope, scale, or location. In addition to large-scale projects along the Chicago, French Broad, and Columbia Rivers, Envirolok has a proven track record of success along numerous streams and rivers throughout the globe.



DESIGN



FILL



INSTALL



VEGETATE



FRENCH BROAD RIVER - Riverbank Restoration

Year Constructed: 2015

Project Size

4750 Units/700 lf

Client

Tennessee DOT

Reinforcement

Geogrid

Vegetation

Live Stakes

Engineer

Freese & Nichols

Contractor

RiverWorks

+ Project Snapshot

A section of the French Broad Riverbank had been severely damaged due to flooding conditions during the construction of a new bridge. The bank erosion threatened both the recently installed bridge infrastructure and an adjacent railroad line. A regulatory directive was imposed, requiring an engineered, permanently vegetative stabilization method to be implemented. Envirolok created the solution needed to permanently stabilize the slope. The site was regraded in preparation for installation and along every third course of bags, geogrid was used to anchor the system. As rows of Envirolok bags were installed dormant brush material was placed for vegetation growth. Four boulder vanes were constructed into the river to help slow the velocity of the water and help direct stream flow away from the tow of the bank. Upon completion the top of the slope and all other areas were seeded and mulched with a riparian seed mix. During the dormant season native trees and shrubs were planted for long term stability. Continued monitoring has shown a strong Envirolok system with thriving vegetation.



Envirolok, LLC | www.envirolok.com | ecosolutions@envirolok.com

10101 N Casey Road Evansville, WI 53536 | 608.226.2565

LAKEWOOD COUNTRY CLUB - Creekbank Restoration

Year Constructed: 2016

Project Size

150' x 12-15'

Client

Lakewood Country Club

Reinforcement

Geogrid

Vegetation

Hydroseed

Engineer

Robert Race, P.E.
Envirolok Consulting Engineer

Contractor

Naranjo Civil Constructors

+ Project Snapshot

An existing timber retaining wall along Lakewood Gulch was beginning to decay and the banks of this waterway were in jeopardy. There was a need to stabilize the soil along the bank and prevent the erosive forces from the stream below. Envirolok was chosen to replace the existing wall and create a natural corridor that would be able to withstand flooding events. The failing wall was removed, and the banks were regraded to a 1:1 slope. Existing boulders were reused at the toe of the slope to prevent future scouring. By installing the Envirolok system, they were able to create a new cart path along the top of the slope. Geogrid was used between every third course to reinforce the slope and give it added sheer strength and stability. Once the system was in place, a hydroseed mix of native flowers and grasses was chosen to vegetate the system. Two years after installation, the project is solid, with no signs of damage from the waterway, local wildlife, or golfers. The Envirolok system provided the means for the client to accomplish all of their goals for this project.



CHICAGO RIVER - Riverbank Restoration

Year Constructed
2007

Client
City of Chicago

Reinforcement
Geogrid

Vegetation
Plant Plugs
Hydroseed

Contractor
Robert Ebl Inc.

+ Project Snapshot

The City of Chicago wanted to enlarge a small parking lot located along the Chicago River. However, due to site limitations, the proposed expansion required building on an unstable riverbank. To complete the project, the shoreline needed to be permanently stabilized. The City of Chicago recognized that the site is highly visible due to the Belmont Avenue Bridge and the current landscaping was an eyesore. Envirolok was chosen because it could address both of these issues. Envirolok could stabilize the slope for the parking lot expansion and provide an aesthetically pleasing look for people driving by. The Envirolok system was installed in the fall of 2007 and seeded in the spring of 2008. Geogrid was used to reinforce the slope and provide added strength and stability along the riverbank. The entire system was planted with native plant plugs and hydroseeded for lush vegetation. A stormwater discharge pipe was integrated into the Envirolok system to provide an outlet for runoff from the parking lot. The system is still going strong and provides an aesthetic and functional solution to the problem.



SANDY RIVER - Riverbank Restoration

Year Constructed
2011

Client
Private Homeowners

Reinforcement
Geogrid

Vegetation
Live Stakes, Plant Plugs
Hydroseed

Engineer
Robert Race, P.E.
Envirolok Consulting Engineer

Project Partners
Sunmark Environmental
Services, LLC

NorthWest Hydro-Mulchers

+ Project Snapshot

During a high flooding event, the riverbank beneath this home began to collapse and wash away. This needed to be stabilized as soon as possible and required a fully engineered, stable solution that would prevent this from happening in the future. Envirolok was chosen because it could provide the solution needed and permits were received within 10 days of the incident. For construction, they cut into the existing bank above the water's edge and placed a hard armor of large boulders and rootwads to help absorb and deflect incoming energy from the river. This stabilized the toe of the slope and the Envirolok units were built up the slope. Geogrid was wrapped around the Envirolok bags and embedded into the riverbank to provide sheer strength. The entire slope was then planted with over 800 native plant stakes, plugs, and hydroseeded to create dense vegetation that would further bind the system to the parent material. Envirolok was able to stabilize the slope, prevent further erosion, and was a quick easy solution to a disastrous event.



COLUMBIA RIVER - Riverbank Restoration

Year Constructed
2009

Client
Private Landowner

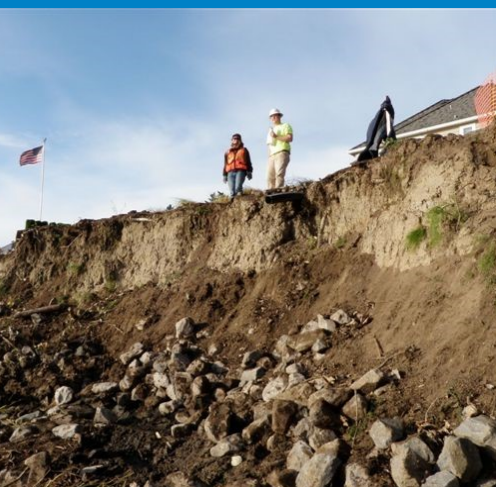
Reinforcement
Geogrid

Engineer
PBS Engineering
& Environmental

Project Partner
Sunmark Environmental
Services, LLC

+ Project Snapshot

Along the Columbia River, continual erosion was causing the river bank to lose over 18" per year. For this homeowner, they were losing property and their landscaping so they looked for a soft armor solution to restore the riverbank. Additionally, several small springs were adding to the erosion and needed to be addressed to create a long-lasting solution. This area was of cultural significance as it was utilized by many Native American Tribes throughout history. An archeologist had to be on-site during construction to monitor and identify any significant historical items found. There was limited access to this site so all construction activities had to take place from a barge. Envirolok was the perfect solution due to its easy installation, slope stabilization, and quick vegetation. In combination, root wads were included to reduce water energy and promote habitat improvement. Geogrid was used to reinforce the slope and once installed and vegetated, the system has held strong and provided the soft armor solution to this residence's erosion control problems.



SOPHIA CREEK - Creekbank Stabilization

Year Constructed: 2015

Project Size: 115m²

Client: City of Barrie

Reinforcement: Geogrid

Vegetation: Hydroseed

Engineer

GHD – Waterloo, ON

Contractor: City of Barrie

Bag Filler

Marco Clay Products

Approving Authority

Lake Simcoe Region
Conservation Authority

+ Project Snapshot

After years of flooding and multiple 100-year storm events, the slopes, banks, and stream channel began to fail around an existing culvert. This section of Sophia Creek had approximately 2m high bare slopes undercut by water flow erosion. Working with the City of Barrie, old gabion baskets were removed around the existing culvert, and 25m of creek bank were replaced with the Envirolok system. During construction, Sophia Creek experienced an unprecedented 1:100 year storm event that accelerated erosion and caused the culvert to dislodge into the plunge pool. The Envirolok bags were left standing, much to the surprise of the City of Barrie Public Works officials and the Lake Simcoe Conservation Authority. Once construction was complete, the Envirolok system was hydroseeded with native grass, wildflower, and perennial rye cover crop seed mix. By utilizing Envirolok as a long-term solution, the project team quickly established native vegetative cover that continues to withstand urban storm events.



CANOE BAY, COLUMBIA RIVER - Riverbank Restoration

Year Constructed
2013

Project Size
11,000 sf

Client
Private/City of Portland

Reinforcement
Earth Anchors

Vegetation
Plant Plugs

Engineer
Robert Race, P.E.
Envirolok Consulting Engineer

+ Project Snapshot

Prior to the current owner, the project site was used as a dumping ground of various construction materials. Many of these materials were dumped along the river's edge as a means of protecting the bank. High water levels and routine flood conditions continually damaged and began to erode the banks. The property owner worked with the City to look at bank repair options, but found extreme levels of contaminants along the riverbank soils and in the water. In order to complete improvements to the boatyard and marina, the property owner was required to cap and remediate the site at the riverbank. Envirolok was recommended for its ability to create a reinforced and vegetative solution that could also limit contaminants from reaching the waterway. In addition to sealing the contaminated soils, Envirolok could withstand the tidal influences and flood conditions. To reinforce the Envirolok system, earth anchors were used and vegetation flourished, adding additional strength and support. Envirolok successfully remediated this site and created a lasting solution for this eroding riverbank.



GLADE CREEK - Creekbank Stabilization

Year Constructed: 2019

Project Size:
4000 Units

Client: Roanoke County

Reinforcement:
Earth Anchors

Vegetation: Hydroseed &
Live Stakes

Engineer
Freese & Nichols

Contractor: Riverworks

+ Project Snapshot

Glade Creek was experiencing excessive erosion and massive scouring along its banks, leading to the loss of vegetation and increased poor water quality. Due to excessive rainfall, bacteria was discharging into the creek, creating a pressing situation. Roanoke County wanted to remedy this situation and protect the banks from further erosion and provide habitat along the creek. Envirolok was chosen to repair the banks as it has a minimal construction footprint and would be easy to get into this remote site. Hard armoring was used at the toe of the bank to protect against further erosion and 4000 units were anchored to the creek banks via earth anchors. The Envirolok system would provide the strength and stability needed to stop erosion and contain bacteria discharge. Upon installation, Envirolok was successfully vegetated by hydroseeding and live stakes. Envirolok was able to encapsulate the contaminated soil and allow runoff to infiltrate and filter before it reached the stream.

