



## Alternatives to Stream Armoring

# Engineering with Nature

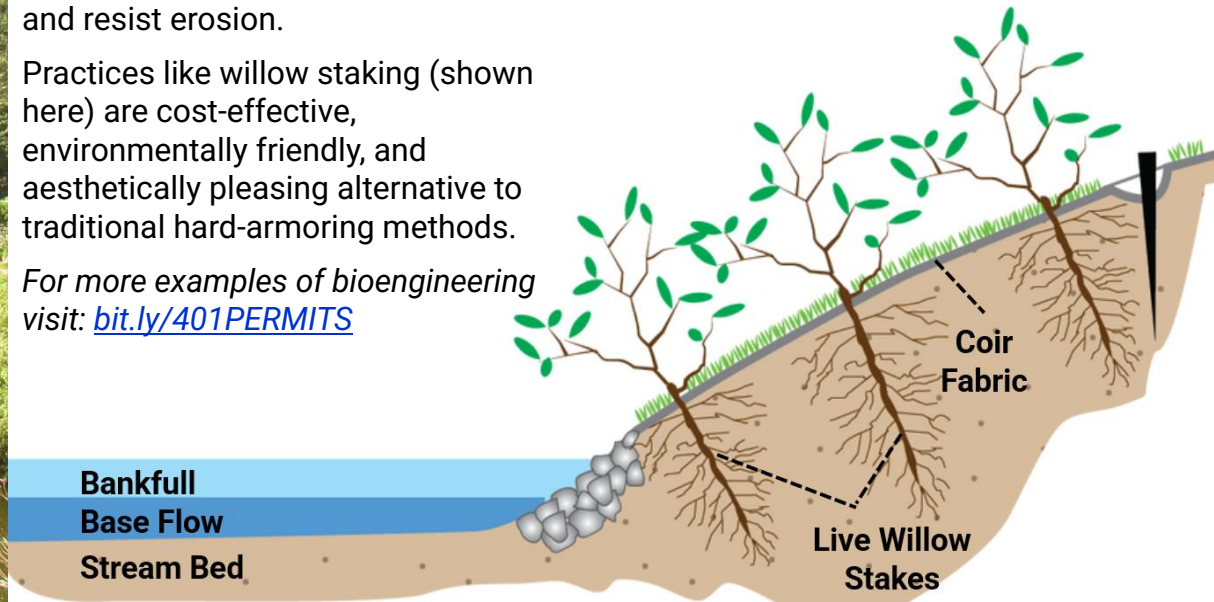
Natural systems can show us how to protect property near eroding or flood-prone waterways.

## Bioengineering Solutions

Bioengineering for streambank stabilization utilizes living plants and plant parts to improve soil strength and resist erosion.

Practices like willow staking (shown here) are cost-effective, environmentally friendly, and aesthetically pleasing alternative to traditional hard-armoring methods.

For more examples of bioengineering visit: [bit.ly/401PERMITS](http://bit.ly/401PERMITS)



## Hard Stream Armoring

Armoring a streambank means adding hard materials like rocks, concrete, or metal to the edges of a river or stream to protect it from erosion.

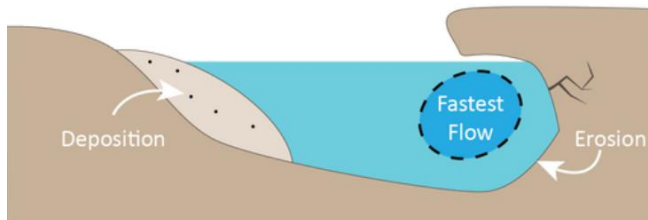
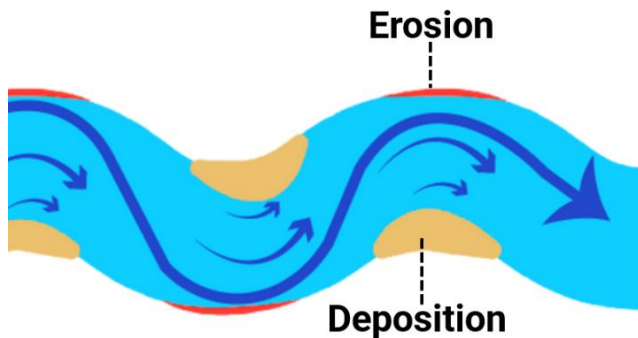
Even though armoring can help stop erosion temporarily right where it's placed, this method of stabilization rarely lasts and can have long-term costs. For example, armoring a stream:

- Speeds up the water, which may cause erosion farther downstream.
- Gets in the way of how the river naturally flows and can harm plants and animals that live in or near the water.
- Is expensive to build and maintain, as they tend to break or get damaged during big storms.

# Streambank Erosion



Streambank erosion is a natural process. Where water flows fastest, sediment is washed away from the bank and it is deposited where flows are slower.



Fast Water = More Erosion

# Things to Avoid

It is important to use proper materials to stabilize your streambank. Using the wrong materials can lead to bank failure and damage to the environment. Avoid the following:

- Creek rock: though readily available it is easily washed away in high flows. Removing rock from the stream channel can also increase erosive flow.
- Grouted rip-rap: restricts flow and grout breaks down over time, undermining the structure.
- Unformed, poured grout or concrete: easily broken as soils shift or the bank is eroded away around the structure's edge.
- Poured asphalt or asphalt pieces: leaks chemicals into the water that is toxic to wildlife and can make it unsafe for swimming and drinking.
- Waste tires or trash concrete pieces: can introduce pollution to the stream and won't hold up over time.



# Slow it Down Soak it Up

Remember: more water, moving fast, leads to more erosion. Strategies to reduce runoff will help stormwater slow down and soak into the ground before it reaches the stream. For example:

- Establish a no-mow buffer along your stream. Plants help keep soil from washing away.
- Plant trees. They help water soak into the ground.
- Install a rain garden or a rain barrel to capture water.

# Do I Need a Permit?

Almost all work in the creek to stabilize the bank will require a permit. The Division of Water (DOW) §401 Water Quality

Certification Program reviews and authorizes selected federal licenses and permits.

# More Information

## Contact Us

Water Quality Certifications Section  
Water Resources Branch  
Call (502) 564-3410  
Email [401WQC@ky.gov](mailto:401WQC@ky.gov)  
Website [bit.ly/401PERMITS](http://bit.ly/401PERMITS)

