

Live Staking for Stream Restoration

A brief introduction and instructional guide to using live staking as an inexpensive and simple technique to restoring eroding stream banks.



Exposed and eroding stream banks can be restored and stabilized through the practice of live staking.

An Introduction To Live Staking

Development, agriculture, and a variety of other disturbances can often lead to unhealthy streams because they remove plant life along streams and increase flow of water. Stream banks that experience these disturbances are often left bare and without a strong root mass in the soil. Without plants and roots, soil particles are more likely to wash away during high waters, heavy rains, and rapid snow melts. This leads to a number of undesirable results including sediment pollution in the water, loss of land, and deeply channeled streams.

There are a number of practices that add plant life back to these stressed streams and help protect and stabilize stream banks, improving the health of the streams. You may have heard the words "riparian buffer" to describe the plants or forest along the sides of streams. Restoring a riparian buffer is one practice, and often includes planting young trees or seedlings, evenly distributed, along the sides of the stream and up to 30 meters away from the stream. These trees not only help hold soil in place but also soak up nutrients, absorb rain water, and provide habitat for wildlife.

Live Staking is another practice, which reintroduces plant life directly in the places that need it most, the stream banks. It has a low cost and is something that land owners can do easily on

their own property. Stem cuttings taken from trees during their dormant season (before the buds break in the spring) are inserted directly into stream banks. These cuttings, referred to as "live stakes," will eventually grow into new trees and are an effective way to establish a root network in the stream banks and help prevent further soil loss.

Harvesting Live Stakes

Live stakes can be purchased from some nurseries, but they can also be harvested directly from trees already on your property. Trees that grow readily along stream banks, such as Black Willow or Red Osier Dogwood, are the recommended species for live staking.



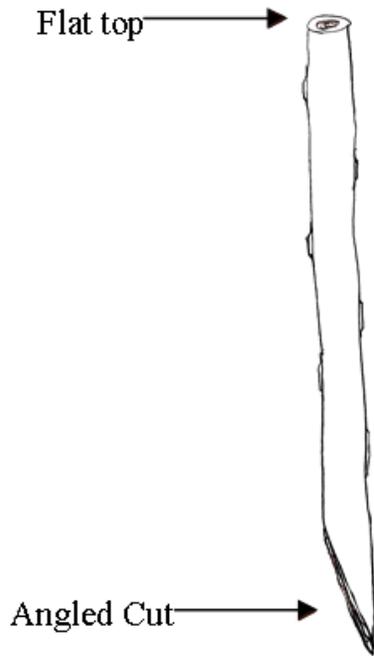
Harvesting live stakes can be done from trees growing right along the stream banks to be restored.

You may already have some of these trees growing on your property, or you may know somebody who does. To harvest live stakes, cut branches that are roughly 1/2 to 1 & 1/2 inches in diameter (some thinner widths may be successful as well) in 2-3 foot lengths. Pruners or loppers work well for this.

Cut the bottom of the stake on an angle to form a point. This will help with inserting the stakes and it also helps you remember which end is which (since trees do not grow as well upside down!) Some branches may be long enough to cut into several stakes, so make blunt or straight across cuts to the tops to keep the ends distinguishable. Small side branches should be trimmed off of the stakes.



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If you are collecting a large number of stakes, drop your cuttings into a bucket of water as you work to keep them from drying out.

Live stake cuttings should be made during the dormant season, before buds break. In Pennsylvania, mid to late March is usually an ideal time for live staking.

It's best to plant your live stakes right after cutting them. If you will be waiting a few days, keep them fresh by storing them in a bucket of water or wrapping them in wet burlap. If you ordered your live stakes from a nursery, it's best to soak the bottoms in a bucket of water for a day or two before planting them. Stored and purchased live stakes also benefit from a fresh, angled cut at the bottom.

Planting Live Stakes

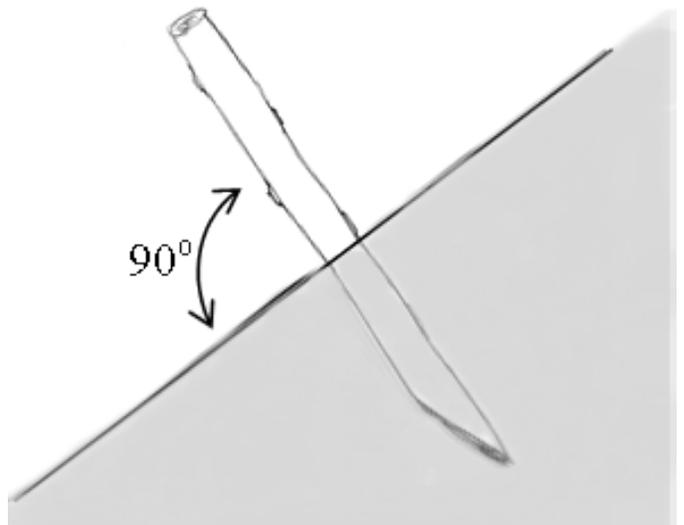
Planting live stakes typically requires getting into the stream, so waders or high boots will be helpful. You will also want a two foot length of rebar or similar material to help create pilot holes for your stakes. You can plan out your planting site in advance or just estimate as you go.

Live stakes should be placed two to three feet apart in several rows along the stream bank. A triangular arrangement helps fill spaces best. Live stakes are planted more densely than these tree species normally would be because there is an expectation that not all of the stakes will survive. Don't plant stakes so high in the stream bank that they won't reach the water table. They need to be in contact with the moisture to succeed.



Live stakes should be positioned approximately 2-3 feet apart in several rows.

Create a pilot hole at a 90 degree angle to the soil surface by pushing the re-bar into the soil and then removing it. Then insert stakes, pointed end first and on the same 90 degree angle, so that about 1/2 to 2/3 of the stake is in the soil.



If banks are nearly vertical, planting stakes so that they are pointed slightly upward can help increase growth success. A rubber mallet can help drive a stake into firm soil, but make a fresh cut on the exposed end afterwards to remove mallet damage.

After Planting

You may see some leaf growth on stakes in the first growing season, but good root growth is more important in the first year. Don't assume stakes didn't survive just because you don't see new growth above ground.

A gentle tug in the fall on a few stakes will help you determine how successful your planting was. Additional stakes can be added in future years to fill in areas that didn't survive. Other than that, they don't require much maintenance at all.



Live stakes may produce some leaves in the first spring after planting, but root development is the most important growth in the first year.

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