View From a Wetland

News and Technology for Riparian and Wetland Management

Interagency Riparian/Wetland Plant Development Project
Natural Resources Conservation Service
Plant Materials Center
Aberdeen, ID

Number 7 (2001)

Project Leader
J. Chris Hoag, Wetland Plant Ecologist

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them." – Albert Einstein

Introduction

This newsletter is part of the Aberdeen Plant Materials Center's continuing effort to provide useable information to the public on wetland and riparian plants, plant establishment, and management. This newsletter is the seventh issue published since the Interagency Riparian/Wetland Plant Development Project was established in 1991.

Riparian/wetland Project

The Project mission is to introduce performance-tested ecotypes to the commercial seed and plant industry and to document technical information to improve the establishment of wetland and riparian herbaceous and woody plants. The Project has collected numerous riparian and wetland plant species in four ecoregions within our Service Area in the arid and semi-arid West. The Project has released 24 performance tested wetland plant ecotypes of six different herbaceous species.

Riparian Ecology and Restoration Workshops

As part of our technology transfer program a two-day Practical Streambank Bioengineering Workshop (renamed from the Riparian Ecology, Restoration, and Management Workshop) was developed. The first day of the workshop is devoted to the classroom where basic riparian dynamics, riparian zone vegetation, plant acquisition, and bioengineering techniques are discussed. The second day is spent at a field location where participants classify the riparian site and install a series of bioengineering structures on an eroding section of streambank.

Each year the Project conducts several workshops in different parts of our service area. If you are interested in attending this course, contact Pat Blaker at the PMC for the next scheduled workshop. If you are interested in a workshop in your area and you have about 30 people, who would attend the training, contact Chris and we will try to schedule a course in your area.

Most common causes of failure when planting woody cuttings

The most common causes of failure when planting cuttings of willow and cottonwood are:

1. Not planted deep enough to reach the lowest water table of the year,
2. Air pockets around the stem that reduces the stem to soil contact necessary for good root production.
3. Planting cuttings with diameters that are too small.
4. Planting the cutting in soil that is too wet.

5. Planting cuttings that were not collected during the dormant time of the year.

One cause of failure that is often misunderstood is trying to plant cuttings in soils that are too wet. With the emphasis on reaching the low watertable of the year, many people tend to translate this as 'plant it in wet soils.' It is important that the cutting stem be partially in aerobic soils and partially in saturated soils. The aerobic soils are where the majority of the roots will grow. Mature, well established willows and cottonwoods are adapted to lots of water. However, when they are young and the roots are developing, they do not handle anaerobic soil conditions well. If your planting site does not have 8-12 inches of aerobic soils above saturated soils, planting cuttings may not be a viable option.

To prevent air pockets around the stem when planting, use a water and soil-slurry mix. This mix will allow the soil to settle around the stem and prevent air pockets. Shoveling soil, either wet or dry, around the stem will generally leave air pockets unless you tamp the soil in with a rod (similar to installing a fence post). Another option is to use a digging method that produces a hole slightly smaller than the cutting diameter. In some soils, this can be a problem, in others it is easy to push the cutting in deep enough and keep a tight fit around the stem.

The minimum cutting diameter that I will plant is ¾ inch. The most common diameter is 1 – 2 in. These cuttings have more stored energy in the stem and are much easier to plant or push into to a hole without breaking.

The highest establishment success rate for planting unrooted cuttings is achieved when the cuttings are harvested during the dormant time of the year. The dormant time of the year is after the leaves drop in the fall and before the buds swell in the spring.

Planting cuttings that have already leafed out is generally not recommended, but has been done successfully. Preliminary data from studies indicate that establishment success is less than 50%. To improve this success rate, we recommend stripping all of the leaves off the cutting. If you are processing the cuttings for pole plantings, you will cut off the top and all the side branches so all the leaves will be gone anyway.

Further information on these factors can be found in The Practical Streambank Bioengineering Guide

Willow Clump Planting: a fantastic streambank bioengineering treatment

Willow clumps, sometimes mistakenly called root wads, are live clumps of willow that are harvested with roots and stems intact. Generally, the clumps are dug up by a backhoe or excavator from an area with a large number of willows. The clumps are usually mature willows, but young ones can also be harvested. The backhoe digs down to harvest about 75% of the root system. Leaving some roots in the hole will allow regeneration of the plant in the future (this is species dependent). If the harvest site gets active flooding with a good sediment load, nature will fill in the hole. If the site does not flood, place clean, weed free topsoil back into the hole after removing the clump.

If the harvest site is too far from the planting site for efficient backhoe travel, consider placing the clumps on a trailer and trucking them to the planting site. Once the trailer is at the planting site, the backhoe can pull the clumps off and plant them. If the distance is reasonable, it is not necessary to cover the roots. However, wetting them down before transport is highly recommended. Drive slowly and plant the clumps as soon as possible when you arrive at the planting site.

When planting the clumps at the project site, remember that willows and cottonwoods grow in depositional areas. This means that unlike conifers, the crown (area where the stem tissue meets the root tissue) of willows and cottonwoods does not have to be at the ground surface. The root system can be planted much deeper ensuring that it is near the low water table. In some cases, the clump root base has been planted 3 feet deep or more to get to the watertable. The stems that are buried will eventually grow roots along the buried sections.

Wetland plant spacing

How does one calculate the number of plants that are needed to populate a wetland? Wetland plant spacing in a constructed or created wetland is a major consideration. In the planning phase, plant purchases are rarely given much emphasis. Engineering fees and construction costs are always considered and funded, while the plant needs are often an afterthought. Plants often get whatever is left over in the budget. There are several problems with this line of thinking. A constructed wetland system is a biological system. Without the plants, the biological system will not function effectively.

When planning what to spend for plants, you should determine how many plants are needed to populate the wetland. I generally recommend a spacing of one plant every 18 in^2. This spacing allows the interspaces to fill in over one growing season when using rhizomatous plants. Generally, I use a figure of \$1.00-\$2.00 per plant for budgeting purposes. This assumes that the minimum plant size is 15 in^3 (see *View From a Wetland Number 6* for a discussion on plug sizes). In terms of the project budget, consider allocating about 25% of the total project cost to purchase and install plants.

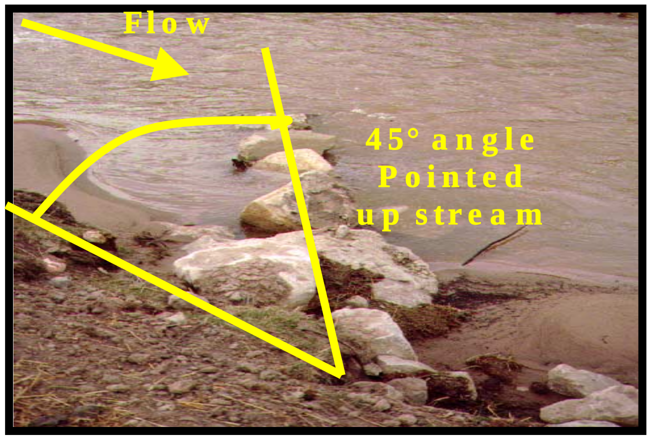
What if you don't have enough money to purchase all the plants you need? A commonly asked question is whether the spacing can be increased from 18 in^2 to 36 in^2. Remember that as a biologic system, the plants and microbial populations associated with the plants are what make a constructed wetland system work. The wider the spacing, the longer it will take for the plants to fill in and the longer it will take for the system to fully function. If you still don't have enough money to purchase the needed plants or have a good donor site to collect from, plant the plants in copses (small groups) that are 10-20 ft in diameter with the individual plants at an 18 in^2 spacing. Separate the copses by about 10-12 ft. This will give you better establishment overall and the colonies will eventually spread into the open spaces. If you get additional money the next year, plant the remaining open spaces.

The best thing to do when planning and budgeting for a constructed wetland project is to allow enough money for the purchase and installation of the plants in the beginning. This will decrease the hassles once construction ends and you are trying to figure out how to plant the entire area.

Combination of Hard and Soft Treatments is often the best

One of the driving forces behind the use of soft (or streambank bioengineering treatments) versus hard (or rock treatments) has been the downside of rock structures, i.e. aesthetics, lack of water quality benefits, poor wildlife habitat, etc. A combination of hard and soft structures can incorporate the best of both treatments and improve the overall streambank stabilization effort.

Rock structures can be important in stabilizing the streambanks and allowing the vegetation a chance to get started. This is especially true in larger river systems. The two most common hard structures that I recommend are: 1) Barbs (also called Spurs, Vanes, or Deflectors), and 2) a rock toe.



Barbs tend to nudge the current away from the eroding bank. If installed correctly they do not force the current into the opposite bank. The real advantage is that they allow the vegetation to get established in areas where it would be nearly impossible if the plants were not protected.

Rock toes are installed in the toe zone (see Info Series 16) where vegetation is difficult to get established. After the vegetation is established, the rock is very difficult to see because it is covered by the plants.

Additional Information

All publications are now available on the Internet in Adobe Acrobat format. **NOTICE: We have moved our website address.** You can download each of the papers by going to http://Plant-Materials.nrcs.usda.gov/idpmc. Once at this site, click on Riparian/Wetland Project in the lower left to get to the correct page. If you do not have access to the Internet or would like to receive a hard copy, please contact us.

Bioengineering Information

The Practical Streambank Bioengineering Guide: A user's guide for natural streambank stabilization techniques in the arid and semi-arid Great Basin and Intermountain West. – Available on the Internet at http://Plant-Materials.nrcs.usda.gov/idpmc**.** The Internet version of the Bioengineering Guide is in 4 files written in Adobe Acrobat format.

Individual Wetland Plant Fact Sheets – description, ecology, collection, propagation, management, and uses of:

Nebraska Sedge *(Carex nebrascensis)*
Creeping Spikerush *(Eleocharis palustris)*
Baltic Rush *(Juncus balticus)*
Threesquare Bulrush *(Scirpus pungens)*
Alkali Bulrush *(Scirpus maritimus)*
Hardstem Bulrush *(Scirpus acutus)*

Riparian/Wetland Project Information Series

No. 2 - Selection and Acquisition of Woody Plant Species and Materials for Riparian Corridors and Shorelines.

No. 3 - Use of Willow and Cottonwood Cuttings for Vegetating Shorelines and Riparian Areas.

No. 6 - Seed and Live Transplant Collection Procedures for 7 Wetland Plant Species.

No. 7 - Use of Greenhouse Propagated Wetland Plants Versus Live Transplants to Vegetate Constructed or Created Wetlands.

No. 8 - Constructed Wetland System for Water Quality Improvement of Irrigation Wastewater.

No. 9 - Design Criteria for Revegetation in Riparian Zones of the Intermountain Area.

No. 10 - Perigynium removal and cold-moist stratification improve germination of *Carex nebrascensis* (Nebraska sedge)

No. 11 - Getting "Bang for your Buck" on your next Wetland Project.

No. 12 - Guidelines for Planting, Establishment, Maintenance of Constructed Wetland Systems.

No. 13 – A Reference Guide for the Collection and Use of Ten Common Wetland Plants of the Great Basin and Intermountain West.

No. 14 - Harvesting, Propagating and Planting Wetland Plants.

No. 15 - Costs and considerations of streambank bioengineering treatments.

No. 16 – Riparian Planting Zones

No. 17 – Waterjet Stinger: A tool to plant dormant unrooted cuttings of willows, cottonwoods, dogwoods, and other species

Idaho NRCS PM Technical Notes

No. 6 - The Stinger, a tool to plant unrooted hardwood cuttings of willow and cottonwood species for riparian or shoreline erosion control or rehabilitation.

No. 23 - How to Plant Willows and Cottonwoods for Riparian Rehabilitation.

No. 32 – User's Guide to Description, Propagation and Establishment of Native Shrubs and Trees for Riparian Areas of the Intermountain West.

No. 38 - User's Guide to Description, Propagation and Establishment of Wetland Plant Species and Grasses for Riparian Areas in the Intermountain West.

For a copy, write or call:

Interagency Riparian/Wetland Project
Plant Materials Center
USDA, NRCS
P.O. Box 296
Aberdeen, ID 83210
Phone (208) 397-4133
Fax (208) 397-3104
Email – **chris.hoag@id.usda.gov**