

Volunteer *Handbook for Riparian Restoration*



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Dear Volunteer:

Welcome! Thank you for your interest and desire to contribute your time, energy, enthusiasm and talents for the benefit of wildlife and fish across the State of Idaho! Your efforts will help rebuild quality riparian ecosystems!!

Whether you are a new or veteran volunteer, your time and abilities are important and worthwhile. Successful organizations recognize it is important to provide an environment where volunteers can build relationships with staff and other volunteers, and gain knowledge about wildlife and wildlife management.

This *Volunteer Handbook* is designed to introduce you to volunteering and to riparian ecosystems and their restoration. The first chapter provides some general information about volunteering, and the second chapter covers riparian restoration techniques. Please use this *Handbook* as you begin your work and continue to use it as a reference guide. The authors, Susan Werner and Ed Papenberg, of Idaho Department of Fish and Game, welcome you to volunteering!

Thank you for joining an important team effort!

Contents

Welcome

5-10 **Chapter 1**
Volunteering

11-25 **Chapter 2**
Riparian Habitat and Its Restoration

14-17 Pole Planting

18-21 Vertical Bundles

22-25 Containerized Plantings

27 References



Planting willows along stream bed.



Chapter 1

Volunteering

You have expectations when you volunteer, and your sponsor has expectations of you for the project. This chapter discusses expectations and responsibilities when volunteering. Much of the information contained in Chapter 1 came from the *Colorado Division of Wildlife's Volunteer Handbook*, (2010).

Expectations

Volunteer Expectations and Duties

- Be honest and open with potential sponsor organizations regarding your intent, goals, needs and skills so you can be given an appropriate assignment.
- Understand the requirements of time and duties before accepting an assignment.
- While volunteering, stay within the duties of the project assignment.
- Consider your assignment a serious job commitment and view the position as valid and important.
- Be aware of the policies and procedures of the sponsoring organization. Understand that if you cannot abide by them, the sponsor may discontinue your service.
- Participate fully in training and meetings associated with the volunteer work.
- Be prompt and reliable in reporting for work. Notify your project leader or coordinator as soon as possible if you are unable to work the scheduled shift(s).
- Dress in an appropriate and professional manner for the position assigned.
- Follow your volunteer assignment and accept supervision.
- Return equipment at completion of assignment.
- Return project evaluations when requested.
- Understand that the public will view you as a representative of the sponsor organization. You should discuss your role in public communication with your supervisor. (For example, should you be ready to answer questions about the project you are working on, but refer other questions to your supervisor?)



Keep Your Sponsor Informed

- Notify supervisor of any address or phone number changes as soon as possible.
- Provide adequate notice to your supervisor or coordinator before terminating your position.
- Notify your supervisor immediately of an accident during your volunteer work.

Volunteer Code of Ethics

- I must be courteous, professional and respectful at all times.
- I will be mature, honest and ethical in my conduct, including but not limited to, relationships with staff and other volunteers and interactions with the public and landowners.
- I must respect the organization's judgment, goals, and policies even if they conflict with my personal beliefs; however, if I feel very strongly about a particular issue, I will discuss it with my project leader.
- I will use care and behave appropriately when using organization equipment.
- I will keep safety as my primary priority and will report any accidents or injuries to my project leader or volunteer coordinator immediately.
- I will never put myself in dangerous or threatening situations.
- I will not participate in or condone illegal activities.



Expectations

What You Should Expect of Your Sponsor Organization

A Positive Experience

- Support and efforts by the organization to make your experience satisfying and rewarding.
- Opportunities to expand your knowledge and skills in a variety of geographic areas.
- Appreciation and recognition for time, effort, or materials donated to the organization.

A Fair and Safe Work Environment

- Orientation and training for the safe and successful performance of duties.
- Support from the supervisor to resolve conflicts between you and a staff member or other volunteer.
- Courteous and respectful treatment by organization employees and other volunteers.
- To be informed in advance of any required equipment or skills.

Idaho law limits the liability of individual volunteers (who do not receive salary or wages) of nonprofit corporations and organizations for conduct within the scope of the volunteer duties, unless the liability involves the operation of a motor vehicle, or involves conduct that is willful, illegal, fraudulent, or bad faith. You should discuss with your supervisor whether your volunteer work is covered by worker's compensation or other insurance.

Safety

Volunteers should consider their own safety and that of those around them at all times. As a volunteer you should insist on safe work areas and methods. Supervisors and volunteers should make sure any appropriate safety training for using equipment and safety procedures are reviewed before beginning an assignment.

Personal Gear

Restoration projects take place in a variety of work settings and weather conditions. Work may require you to work on uneven, loose or rough surfaces such as slippery stream banks, round cobbles, snow, ice or mud. Unless arranged in advance with the sponsor organization, volunteers should be prepared with their own personal gear, footwear, outerwear, food and water appropriate to the conditions of the project.

Notes



Equipment

Supervisors should evaluate anyone operating power tools and heavy equipment before the work begins, regardless of a volunteer's experience, and provide an appropriate safety briefing or training. Before operating any equipment, be sure you are familiar with its operation, safety features, and maintenance.

Tools may be borrowed through your supervisor for use on projects. Equipment must be returned in the same condition as when loaned and at the completion of work. Failure to return loaned equipment could result in charges being filed for theft.

Vehicles

Vehicle safety is the responsibility of the vehicle's owner, driver, and passengers. Sponsor organizations should have driver and passenger safety requirements, including the wearing of seat belts by all vehicle occupants. Before driving a car on a project, volunteers should make sure that the vehicle and its safety features (such as lights and spare tires) are in proper working order and that the vehicle has enough gas. If the sponsor provides vehicles, the sponsor and volunteer should make sure the volunteer is familiar with operation of the vehicle before its use. Sponsors will typically require that vehicles are returned fully fueled and clean. Drivers should report any problems with sponsor vehicles to the supervisor.

State law requires certain insurance coverage for operation of motor vehicles. The supervisor and volunteer should make sure organization or personal vehicles have this coverage prior to using them on a project.

Emergencies and Accidents

The supervisor and volunteer should review what to do in case of emergencies and accidents prior to beginning an assignment. They should review the location of first aid supplies and emergency equipment such as fire extinguishers and be familiar with emergency communications via phone or radio.

A volunteer involved in an accident of any kind while working for the organization must notify the supervisor as soon as possible by phone or in person. This includes accidents involving serious injury, death, or that might cause criminal charges to be filed against the volunteer. The supervisor should provide all required forms, and the volunteer must comply with time limits for filing these reports.



General Information

Personal appearance

Your personal appearance is important. Your dress should be consistent with safety and what the project sponsor and your supervisor consider appropriate attire. If you report for an assignment improperly dressed or groomed, you may be asked by your supervisor to change clothes or to leave the work site.

Expense Reimbursement

As a general rule, volunteers are not reimbursed for expenses. You will be notified before beginning work if you are eligible to receive any reimbursements.

Minors

Federal child labor laws apply to volunteer situations. Volunteers under 18 years of age will not be permitted to:

- Work on or near explosives
- Operate power tools or other potentially hazardous equipment
- Drive an official vehicle, or ATVs
- Work over 40 hours in a week or more than 8 hours in any 24-hour period
- Most sponsor organizations will require minor volunteers to be accompanied by an adult or guardian unless previously approved.

Harassment/Discrimination

Federal and state laws regarding sexual harassment and discrimination (based on race, color, religion, sex, national origin, physical or mental abilities) apply to most volunteer assignments. A good rule of thumb is, "If in doubt, don't." If you feel you or someone else is being illegally harassed or discriminated against, immediately contact your project leader.

Use of Personal Equipment/Vehicles

Individuals who wish to use their personal equipment or vehicles for volunteer work are typically allowed to do so. The organization may not, however, cover personally owned items against theft, damage or other losses. Be sure your property is protected under your own private insurance coverage. State law requires certain insurance coverage for all motor vehicles.

Notes



Notes

Project Evaluations

If you have comments to make regarding projects, please share this information immediately with your supervisor. Evaluations are used to improve projects and make your future experiences as enjoyable and worthwhile as possible. Feedback may also be provided by phone. Anonymous comments are acceptable. Your participation in evaluations is the key to the success of the program.



Chapter 2

Riparian Habitat and Its Restoration



Vegetation along a stream bed provides shade and bank stabilization

This section covers how to create restoration projects to improve and protect riparian areas.

Riparian Habitat

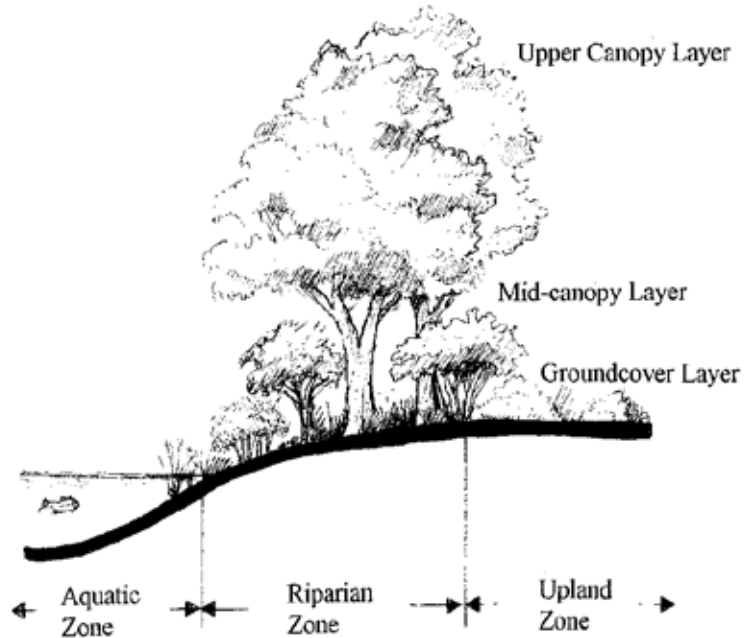
Much of the information contained in this section of the manual was excerpted from *The Practical Streambank Bioengineering Guide* written in 1998 by Bentrup and Hoag. Credit for illustrations and text describing pole plantings and vertical bundles goes to these authors.

Notes



What is Riparian Habitat?

Riparian habitat is the green, vegetated area on each side of streams and rivers. It is the area between the aquatic or river ecosystem and the upland area that is periodically influenced by flooding. Often riparian habitats are structurally complex and contain many plant species, meaning there are plants of varying heights and densities



Riparian zone

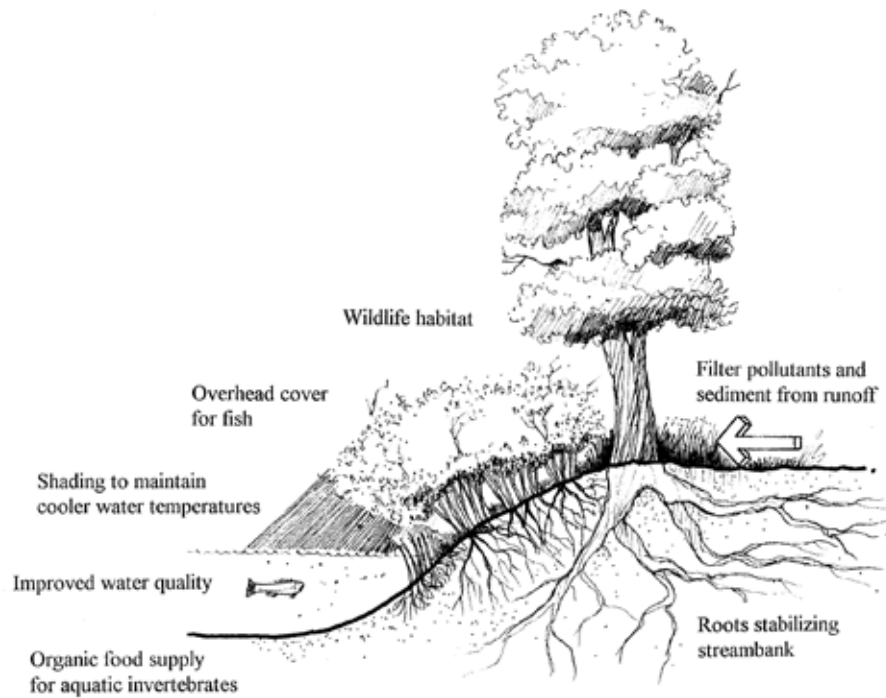
Why is Riparian Habitat Important?

Riparian habitats are important in Idaho. They serve many functions, including:

- purifying water by removing sediments and other contaminants;
- reducing the risk of flooding and associated damage;
- reducing stream channel and stream bank erosion;
- increasing available water and stream flow duration by holding water in stream banks and aquifers;
- supporting a diversity of plant and wildlife species;
- maintaining a habitat for healthy fish populations; providing water, forage, and shade for wildlife and livestock;
- creating opportunities for recreationists to fish, camp, picnic, and enjoy other activities.

Forty six percent of Idaho's bird species nest in riparian ecosystems yet less than one percent of Idaho's landscape are covered with riparian vegetation. (Idaho Partners in Flight, 1998)





Riparian functions

Why is Riparian Habitat Restoration Necessary?

Throughout history, riparian areas have been impacted by multiple uses of the land. Poorly planned timber cutting, mining, poorly managed livestock grazing, noxious and invasive plants, and recreation have all played a role in the degradation of riparian habitat across the state of Idaho. Natural events such as flash floods may damage riparian habitats. In some areas, the riparian zone has been eliminated, and in others it has been severely damaged. Recent recognition of the importance of riparian systems has focused attention on their health. Poorly functioning riparian systems provide poor fish and wildlife habitat, fail to filter pollutants from runoff, do not stabilize stream banks, and impact water quality downstream.

With riparian areas serving important ecological functions yet covering such a small portion of the surface area of Idaho, improving the health of these systems has become important to improving overall ecosystem function. Several government agencies and private groups have focused attention on projects designed to restore the health of riparian areas to fully functioning systems. This document will focus on three bioengineering techniques that are commonly used in restoration projects that use volunteers to accomplish much of the work. There are many other techniques that interested readers can explore in other documents.

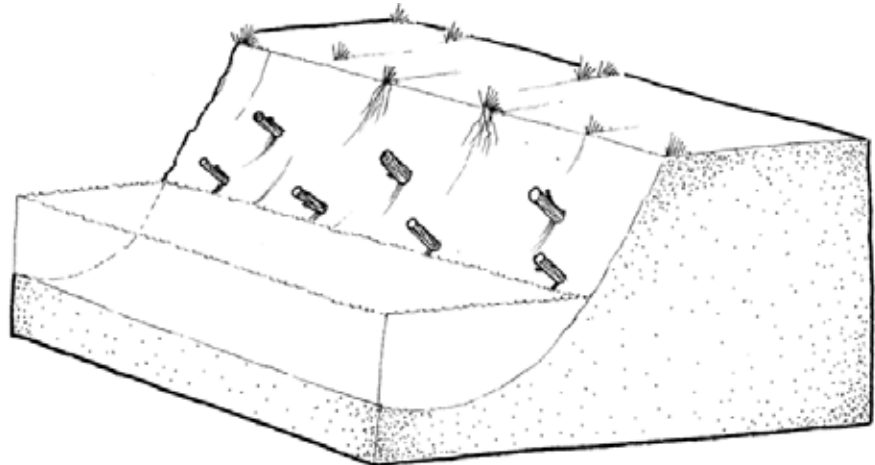


Techniques Used in Riparian Habitat Restoration

Bioengineering is used here to mean using living woody and herbaceous materials to increase the stability of the soil. The goal is to create a dense matrix of roots which hold the soil together. The above-ground vegetation increases the resistance to flow and reduces flow velocities by dissipating energy. The biomass also acts as a buffer against the abrasive effect of transported materials and allows sediment deposition due to slower water speed near the bank (Allen and Leech 1997). Bioengineering techniques emphasize the use of natural, locally available materials such as earth, vegetation, rock, and lumber in contrast to steel and concrete.

Pole Plantings

Pole plantings are cuttings from willow (*Salix* spp.) or cottonwood (*Populus* spp.) used to revegetate eroding stream banks. These cuttings will sprout and take root, stabilizing the stream bank with a dense matrix of roots.



Pole plantings

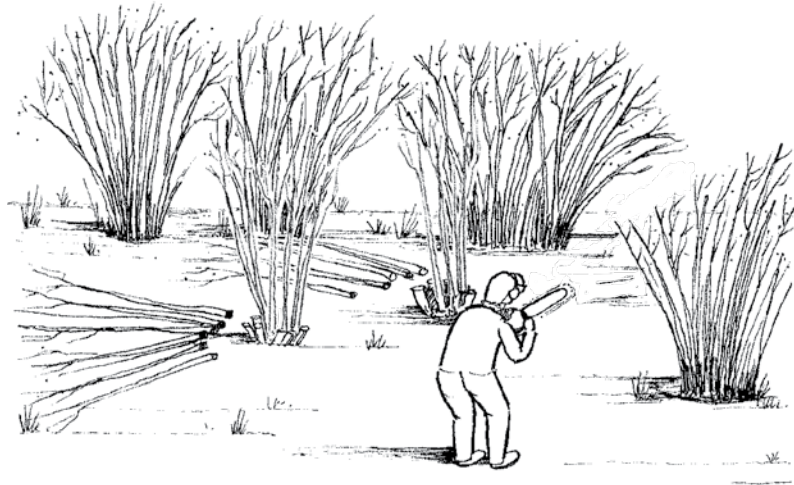
How to Install

1. Collect willow or cottonwood cuttings from a local, native stand that is in healthy condition. Thin source plants no more than 2/3 of each total plant. Willow cuttings for pole plantings should generally be at least 1/2 inch in diameter or larger, depending upon the species. Larger diameter cuttings have a greater supply of stored energy for rooting than smaller diameter cuttings. Bigger diameter and longer lengths are better suited for severely eroded areas and fluctuating water levels. Ideally, cuttings should be collected during the dormant season to ensure the highest success rate. Cuttings can be collected during the growing season if all the leaves are removed from the stem, although establishment success will be lowered. Spring plantings are generally more successful than fall plantings.

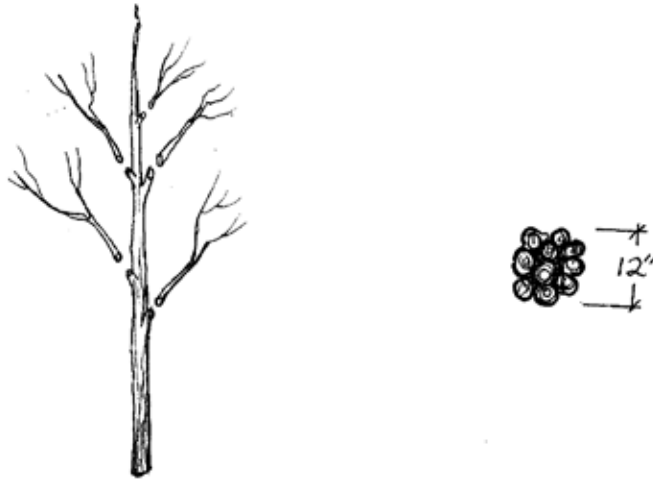


2. Prepare cuttings by trimming off the top one third to remove the terminal bud, allowing a majority of the energy for rooting. Prepare the posts by trimming off all side branches and the top. The bottom can be sharpened into a point to facilitate planting.
3. Soak the posts for 5 to 7 days prior to planting. It is important that the posts be placed in water immediately following harvesting if they are going to be planted during the next week. The cuttings can be kept in cold storage (32 to 35 degrees F) for up to 6 months. After removal from cold storage, cuttings must be soaked prior to planting.
4. Cutting length is determined by site conditions. Cuttings should be long enough to have 2 to 3 feet below the soil surface. The bottom of the cutting should extend several inches into the permanent water table. It should also be long enough to emerge above adjacent vegetation so that new plants will have sunlight.
5. Pole plantings are usually planted with a power auger or a punch bar. These are used to make the holes in the soil. Holes should be perpendicular to the soil surface. Pack soil around the cutting to prevent air pockets. "Mudding" (filling the hole with water) and then adding soil to make mud slurry) can remove air pockets.
6. Plant at least two rows of cuttings. The location of the cuttings will depend on the specific situation and hydrograph. In some cases where information is limited, one row can be planted at the low flow line and the other at the high flow line. Offset the rows to get better coverage.
7. Cuttings will often require initial protection from beaver. Wire screen or mesh can be secured around the cuttings to offer protection.
8. Never disturb the site unnecessarily. Remember the goal is to stabilize a site. The less it is disturbed, the easier it will be to restore.

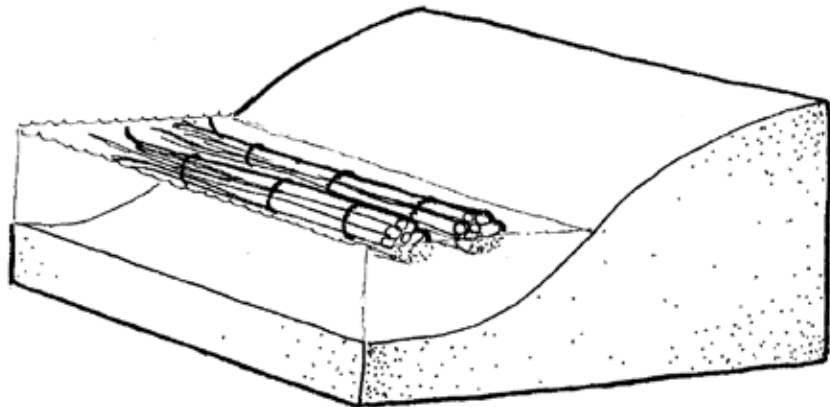




Step 1: Harvest cuttings. These can come from large willows and/or cottonwoods. Cut no more than 2/3 of one plant.

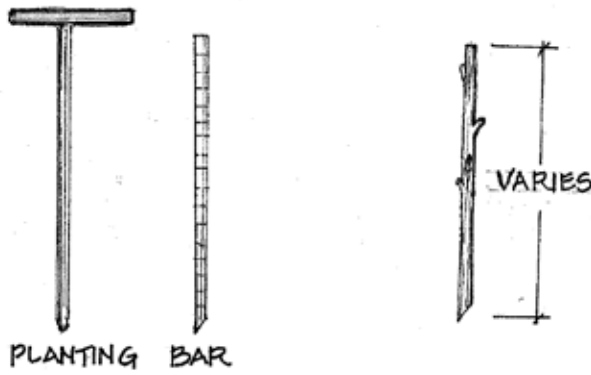


Step 2: Cut off all side and terminal branches. Tie cuttings into 8 to 12 inch bundles using two pieces of twine to facilitate transportation.

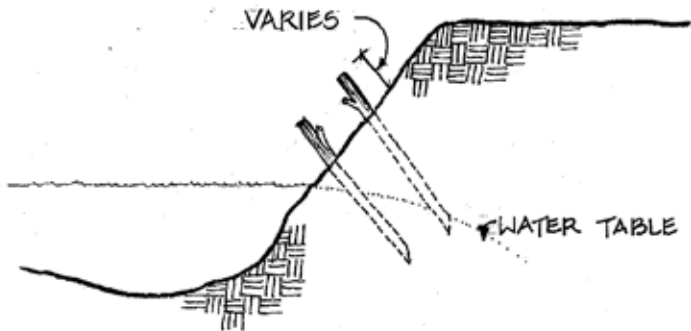


Step 3: Soak bundles in water for 5 to 7 days. Remove from water before roots emerge.

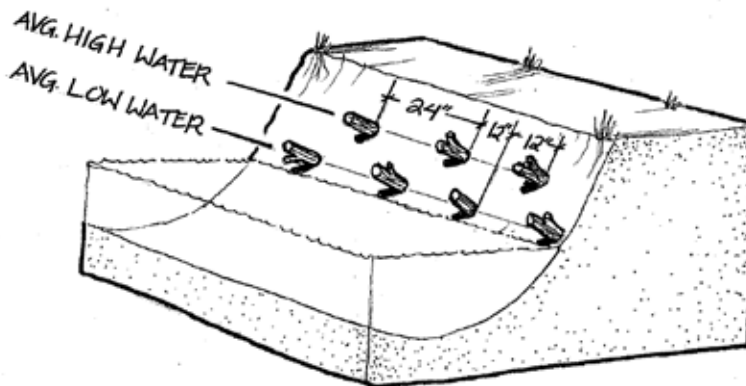




Step 5: Punch bars or augers can be used to create the holes.



Step 6: Plant poles so that the end of the cuttings extends into the water table. Poles should be perpendicular to the soil surface.

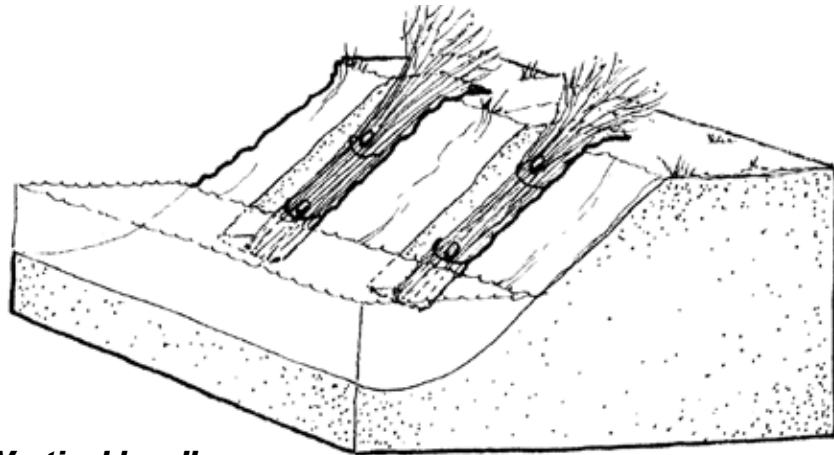


Step 6: Suggested spacing to allow for fluctuating water table.



Vertical Bundles

This technique uses bundles of willow cuttings (*Salix* spp.) placed in vertical trenches along an eroding stream bank. The willow cuttings will sprout and take root, thus stabilizing the stream bank with a dense matrix of roots. Revetment and/or control fabric should be used to protect the bundles until they have become established. This technique is good for areas with fluctuating water levels.



Vertical bundles

How to Install

1. Harvest willow cuttings from a local willow stand that is in healthy condition taking no more than 2/3 of each plant. Cuttings should be at least 1/2 inch in diameter or larger to ensure an adequate supply of stored energy for rooting, but there should be a good mixture of various sizes. This is to ensure trapping of sediment that will promote better root growth. Cuttings should be collected during the dormant season to ensure the highest success rate. Cuttings can be collected during the growing season if all the leaves are removed from the stem, although establishment success will be lowered. Spring plantings are generally more successful than fall plantings.

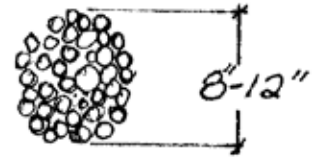
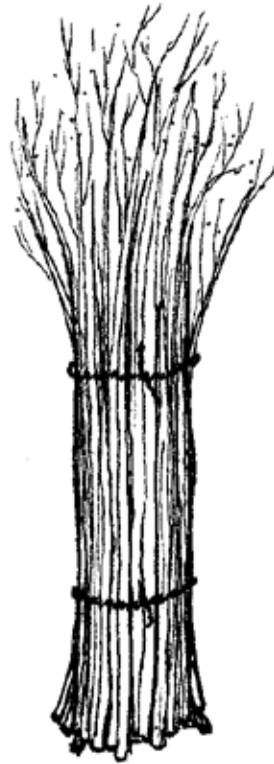
Coyote willow (*Salix exigua*) is a particularly good species for this method because of its dense rhizomatous (or creeping) root system. This technique can also be used with a mixture of redosier dogwood (*Cornus sericea*) and willow, but to encourage dogwood rooting, the stems will need to be manually nicked or cut and treated with rooting hormone.



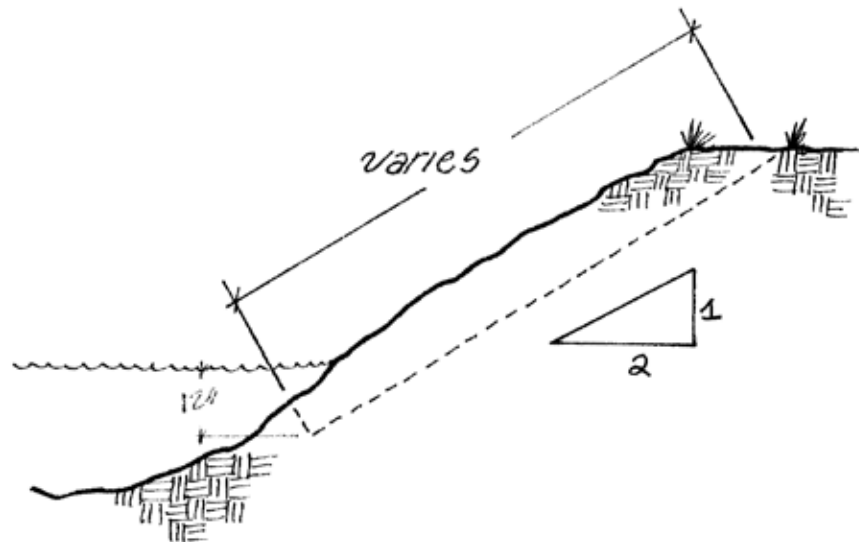
2. The cuttings should be tied into bundles approximately 3 to 18 inches in diameter depending upon use and position with all the growing tips orientated up. The terminal one third of the cutting should be removed so that stem energy will be re-routed to the lateral buds for more efficient root and stem sprouting.
3. The bundles should be soaked for 5 to 7 days.
4. Excavate a vertical trench with a slope of 1:2 or more in the stream bank. Make sure the bottom of the trench will still be under water during low flows.
5. The trenches should be excavated on approximately 3 foot centers to ensure adequate protection of the stream bank and to encourage rapid growth to fill in between the bundles.
6. Place the bundles in the trenches with the cut ends in the water and then secure them to the bank with wooden stakes. In tight soil, spud links or rebar can be used instead of wooden stakes. Partially backfill around the bundles with soil.
7. Bundles may be covered with some type of erosion control fabric to hold the soil in place.
8. Brush revetment or other suitable toe protection should also be installed to protect the toe of the bank from scour. Be sure to protect both the upstream and downstream ends of the treatment area to prevent flows from getting behind the bundles.

Notes



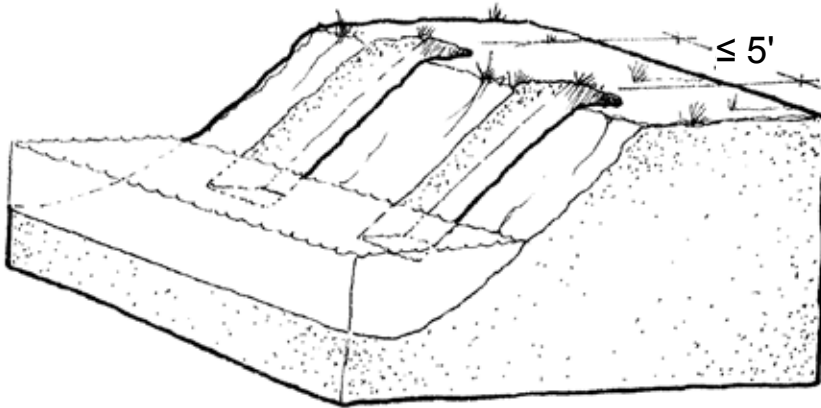


Step 1: Harvest and tie cuttings into 3 to 18" diameter bundles depending upon application using 2 pieces of twine. Soak bundles for 5 to 7 days.

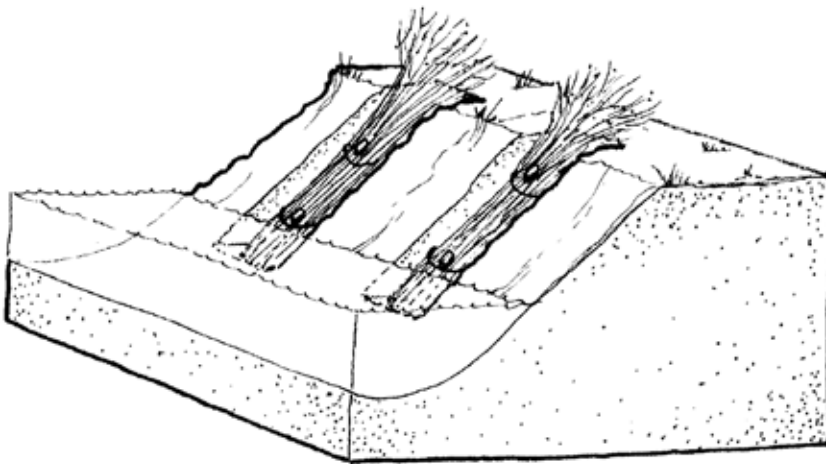


Step 4: Excavate a trench with a 1:2 slope. Make sure the bottom of the trench will be under water during low flow.

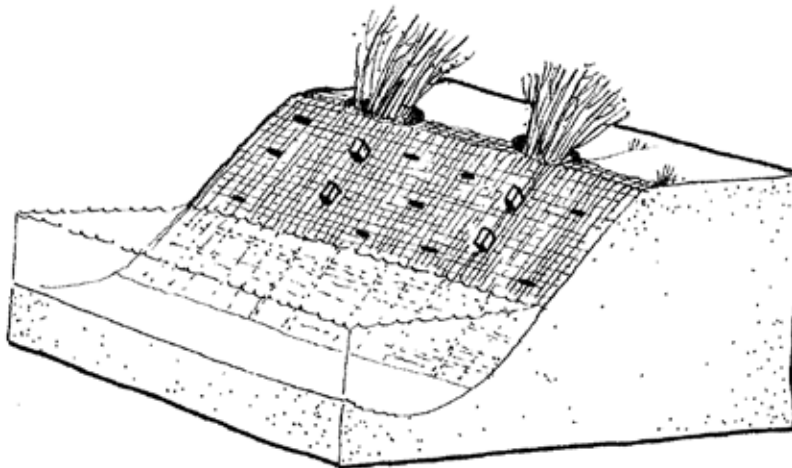




Step 5: Excavate trenches on 3 to 5 foot centers.



Step 6: Secure bundles to trench with stakes and partially backfill. Make sure cut ends are in the water.



Step 7: Secure erosion control fabric over the bundles. Use stakes or rebar pounded into the ground on both sides of the willow bundle to secure the fabric in place.



Containerized Plantings

This technique uses plants that have been grown as nursery stock in pots. These pots can be any size, and root development will vary. In some cases, roots will push out of the pots (the plant has become root bound). In these cases, the root mass will be gently massaged before the plant goes into the ground to encourage new root growth. In other cases, there will be little root development. Removing the plant from the pot needs to be done very carefully so that soil remains around the roots.



Containerized planting



How to install

1. Plan where plants should be located in the planting area. It is important to consider the needs of each plant species for water and sunlight as well as how large the plant will become. Be sure to leave space for each plant to grow. Larger plants each need around 3 feet of space around them.



Plan where to plant

2. Using a shovel, dig a hole that is twice as large as the diameter of the pot. Ideally, the bottom of the hole should fill with ground water. Leave some soft soil at the bottom of the hole. If a post hole borer is used, rough up the sides to allow the roots to penetrate.



Dig a hole twice as large as the pot

3. Gently roll the pot on its side exerting slight pressure on the sides of the pot to loosen the plant and soil.
4. Grasp the stem of the plant, turn over the pot and tap the bottom until the plant releases from the container. Do not yank on the plant stem. It may help to water the plant a few hours before transferring it.



Remove plant from the pot by the stem

Notes



5. Massage the root ball until it loosens slightly.
6. Place the plant in the hole and fill in the space around the plant's base with soil. Compact the soil as it is placed in the hole. Riparian plants can be planted in deep holes. It is okay to cover the stem of wetland plant species with soil. Leave the growing terminal of the plant out of the hole.



Massage the root ball to loosen roots and soil

7. Form a hollow around the base of the plant to trap rainfall.



Place plant in hole and begin to fill with soil



8. Give the plant and surrounding soil a good watering. If bubbles rise out of the ground, there is air mixed with the soil. It is important that air be removed so roots are always in contact with soil. Continue to compact the soil around the base of the plant with a tamping bar, with your foot, or with the handle of a shovel, until no air bubbles rise when the area is watered. Alternatively, a mixture of soil and water can be added to the hole. This prevents air from being mixed with the soil.



Water thoroughly

9. Staking the plants at this stage will make them easier to locate later. Tall thin bamboo stakes can easily be added to the sites. It may also be necessary to protect plants from beavers and other herbivores with fencing. Use enough fence material so animals cannot reach inside and feed on new growth.



Check for air pockets

Notes



References

- Allen, H.H. and J.R. Leech. 1997.** *Bioengineering Guidelines for Streambank Erosion Control. Environmental Impact Research Program Technical Report.* U.S. Army Corps of Engineers Waterway Experiment Station, Vicksburg, MS.
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- Colorado Division of Wildlife. 2010.** *Colorado Division of Wildlife Volunteer Handbook, Volunteer for Wildlife.* Denver, CO. (<http://wildlife.state.co.us/SiteCollectionDocuments/DOW/Volunteer/PDF/VolunteerHandbookFeb2010.pdf>)
- Idaho Partners in Flight. 1998.** *Riparian Riches: Habitat Management for Birds in Idaho.* Boise, Idaho. 18 pp.

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