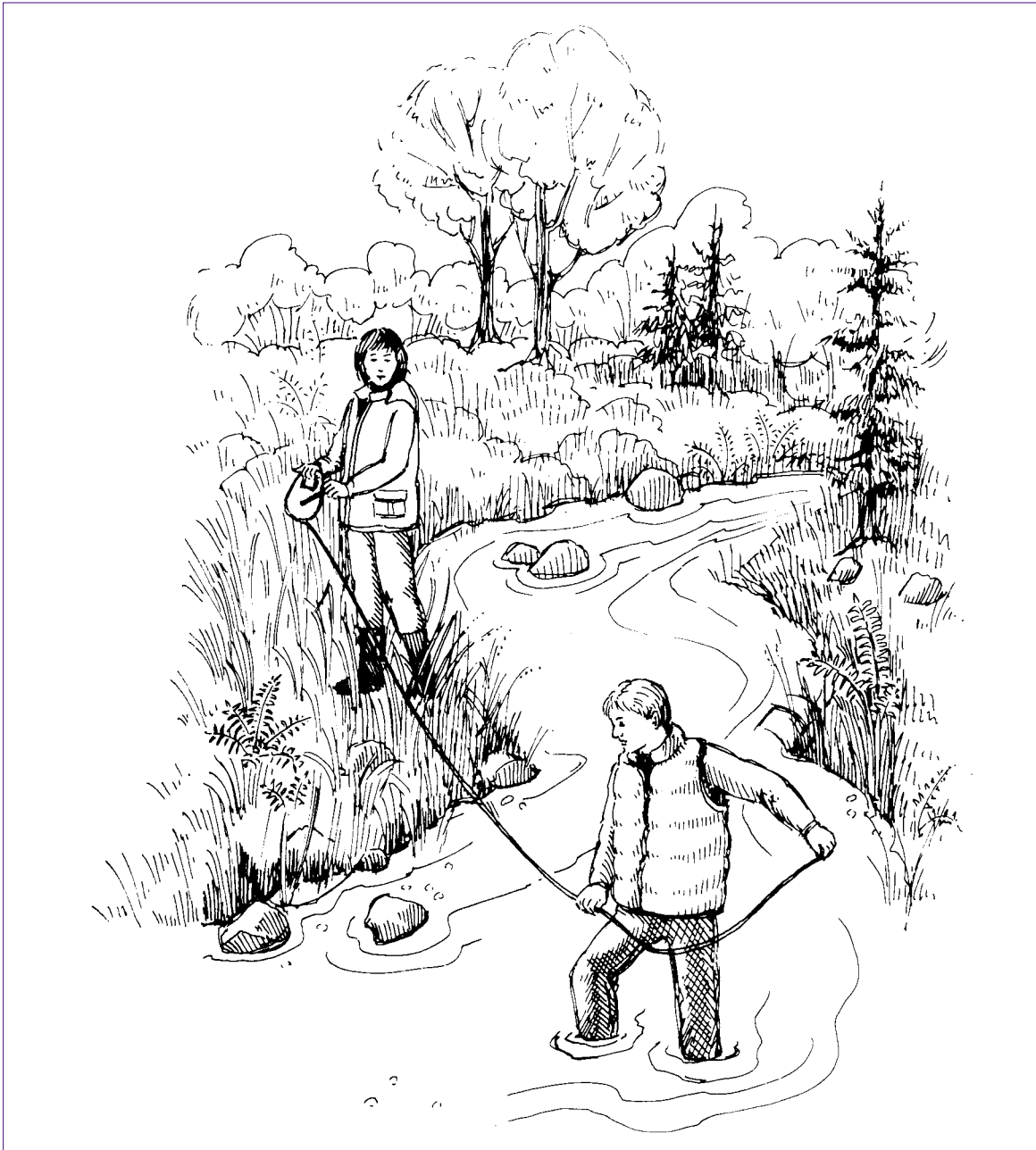


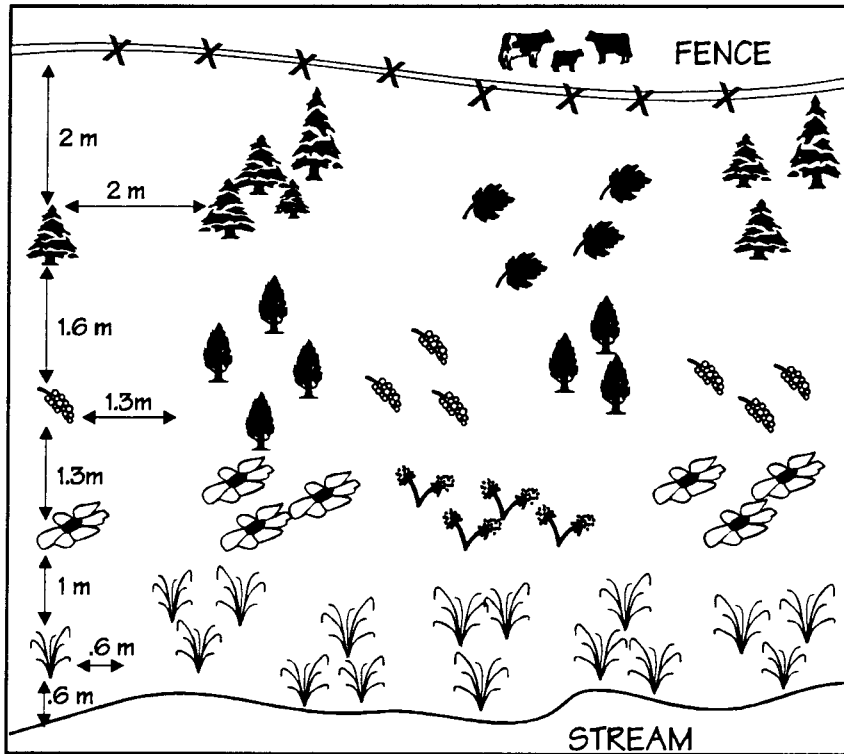
The Streamkeepers Handbook

*A
Practical
Guide To
Stream
And
Wetland
Care*



STREAMKEEPERS

***Module 7
Streamside
Planting***



Project Approval Required	Training	Time Commitment (per year)	Number of People	Time of Year
yes	recommended	A few days	4 or more	Throughout the year

MODULE 7:

Streamside Planting

Welcome to the Streamkeepers Program! The Department of Fisheries and Oceans Community Involvement Program provides these Streamkeepers training modules. These modules encourage “hands on” environmental activities in watersheds in British Columbia. Volunteer groups, schools, and individuals are using this material to monitor and restore local waterways. Your local Fisheries and Oceans Community Advisor can provide more information.

Acknowledgements

Kim Fulton provided the materials for this section. He is a Water Stewardship Coordinator and a teacher in Armstrong. Dr. Michael Carlson and staff of Kalamalka Forestry Research Center, Vernon, provided technical advice and practical assistance.

Project Activity And Purpose

You will restore a stream bank by planting suitable native species to replace native vegetation that has been removed. The project involves obtaining plant stock, planting, and caring for the plants. Over time, the plants will grow and restore the riparian zone of the stream.

Introduction

Trees, shrubs, herbs, grasses, and primitive plants such as mosses and lichen form riparian or streamside vegetation. These plants tolerate occasional flooding. The riparian zone includes the immediate bank of the valley bottom or flood plain. The riparian area of influence may also include the adjacent lower slopes (Figure 1). Stream size and valley topography help define the width of the riparian zone.

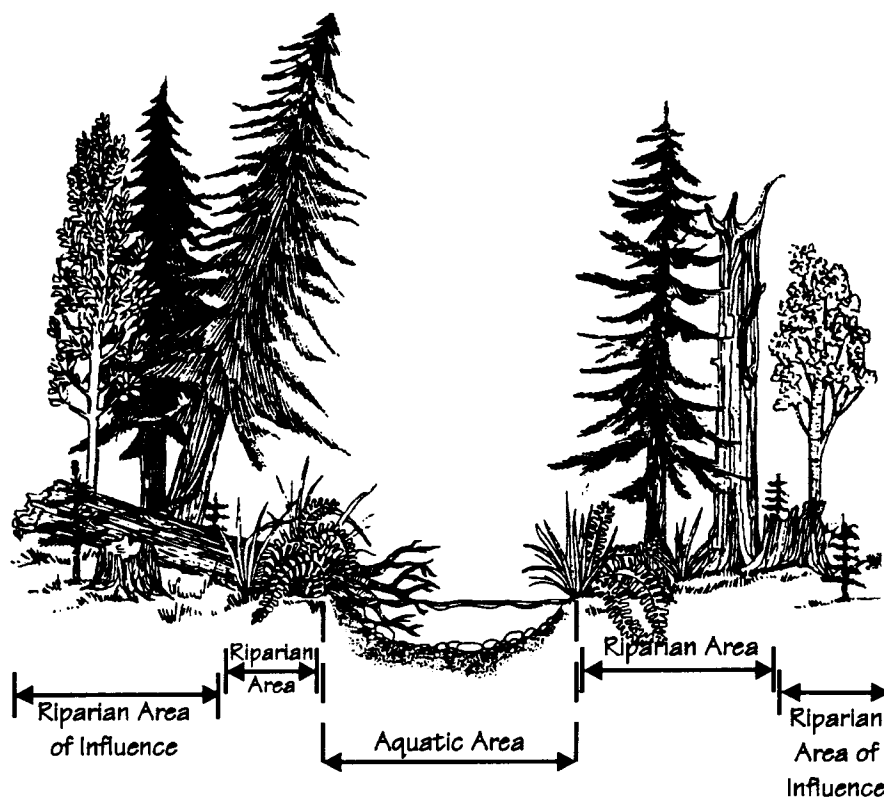
Riparian vegetation is a very important part of a stream ecosystem. Plants stabilize stream banks, reduce erosion, and provide protective cover for fish. Trees provide shade, which helps control water temperatures. Logs fall into the stream, where they create diverse habitat and help dissipate erosion energy. Leaf litter provides an important source of food for stream organisms. Plants trap sediment and filter out pollutants before they reach the stream. They help the soil absorb precipitation and release it slowly during dry spells. The riparian area provides habitat and travel routes for birds and wildlife.

Urban development, logging, and agriculture have reduced or destroyed the riparian vegetation of many streams and rivers.

Fortunately, streamside planting is an inexpensive, effective restoration project. Case studies in Iowa and Ontario show that

Figure 1 Riparian habitat

From *The Stream Scene: Watersheds, Wildlife, and People*.



cottonwood and willow planted on stream banks in agricultural areas reduce pollution in streams. Fertilizers stimulate tree growth rather than algal growth in these streams. The streams recovered within three years.

Project Guidance And Approval

Consult your Community Advisor about streamside planting. He or she can advise you on suitable locations, site preparation, and any necessary approvals. A Streamkeepers certification course offers training for this module. You need the permission of any landowner before you start work. You may wish to present your project at a local council meeting to help gain support.

In areas where livestock have access to streams, you should fence the planting area to protect it. Module 8 provides instructions on fencing. Stabilize any actively eroding stream banks before you start planting. Planting the banks will eventually help stabilize eroding banks, but meanwhile, erosion may wash out the plants before they can become established.

Level Of Effort

Your project requires some planning and organizing, but it need not be time consuming. It may take as little as two months from the time you start planning until planting is complete. It will take longer if you need to stabilize banks or install fences. You should plan on three years of maintenance and follow up.

This is a good annual project for clubs and school groups working alone or together. For example, a club can collect seedlings or cuttings, then work with a school group to plant them.

Table 1 outlines the procedures, time of year, and commitment. Growing conditions vary throughout the province, so the table contains broad recommendations. You can start much earlier in the year in mild coastal areas than in cold interior and northern areas.

Table 1 Procedures, Time of Year, and Commitment for Streamside Planting			
JOB	TIME OF YEAR	TIME	# PEOPLE
planning, approval, ordering any purchased plants	winter	1 day	1 or 2
take dormant cuttings	Jan. to Feb.	half day	4 or 5
establish cuttings	Feb. to May	half day	2
plant the site	Feb. to June	depends on the site size	up to 10
weed and water	July to Sept.	variable	up to 10

Time of Year and Working Conditions

The best time to collect cuttings is during the cool dormancy period in late winter or early spring. Plant the cuttings or seedlings immediately or later in the spring. Maintain the site during summer and early fall.

Safety

PERSONAL SAFETY

Concern for personal safety is essential when working outdoors. Always tell someone where you are going and when you will return. Work in pairs, never alone. Carry emergency phone numbers for police and ambulance.

Do not attempt to wade fast water or water deeper than your knees. Watch out for slippery stream beds, undercut banks, waterfalls, and fast flowing areas. Log jams can be unstable, so take care to walk around them.

Get permission to cross or use private property. Beware of domestic animals and wildlife.

Warn everyone, especially children, about urban hazards such as syringes, needles, broken glass, and condoms. Remove them with tongs and place them in a special hazardous materials bucket. Avoid foul smelling areas, spills of unknown substances, or containers of hazardous or unidentified materials. Contact emergency response agencies or municipal crews to remove these materials.

Be aware of people around you when using shovels and other tools. Watch for tools left on the ground.

HEALTH

Do not drink stream water. Although it may look pristine, it can harbour bacteria or parasites that will make you sick. Do not expose cuts and wounds to stream water. Know the symptoms and treatment for hypothermia.

EQUIPMENT

Carry a first aid kit. When working in isolated areas, carry a survival kit containing at least a lighter, fire starter, candle and flares. Take a cellular phone if you have one.

CLOTHING

Dress for the weather and stream conditions. Wear highly visible clothing. Wear waders with felts when walking in the stream.

Materials and Equipment

Each method of obtaining plants and each phase of the project requires a different list of supplies (Table 2). The project materials may total about \$100.00 for a small project.

Purchased plants grow very reliably, but can be expensive. Native species are available at some nurseries. If you purchase seedlings, make sure they are native species adapted to your climate. Sometimes government programs or private companies supply funds or plants. Growing plants from seed is inexpensive, but requires a greenhouse and two years of growing time.

Table 2 List of supplies required for obtaining plants and planting them
<p>TAKING CUTTINGS for storage or immediate planting: <i>general: field guide to trees and shrubs, clippers, elastic bands for bundling</i> <i>for immediate planting: burlap sacks, buckets, planting dibble, predator guards</i> <i>for storage: plastic bags, twist ties, freezer or fridge</i></p>
<p>STARTING SEEDLINGS FROM CUTTINGS, before planting out: <i>potting soil, planting containers (6-15 styroblocks, milk cartons, peat pots, recycled pots), spring weather or greenhouse, rooting hormones for species other than willow and poplar</i></p>
<p>PURCHASING SEEDLINGS: <i>money (\$5 to \$10 per plant), supplier, scientific names of native plants</i></p>
<p>STARTING SEEDS: <i>potting soil, planting containers (6-15 styroblocks, milk cartons, peat pots, recycled pots), seeds from the wild or from supplier, greenhouse, fertilizer</i></p>
<p>SALVAGING NATIVE PLANTS: <i>square-ended shovel, clippers, wheelbarrow, burlap, twine, capillary bed or similar facility if storing plants</i></p>
<p>PLANTING SEEDLINGS: <i>first aid kit, sturdy footwear, shovels, wheelbarrow (optional), landscape cloth (optional), stakes, several colours of flagging tape, predator guards (mouse guards, 1/8" wire mesh, or aluminum foil), watering cans or buckets, mulch, truck or trailer</i></p>
<p>SITE MAINTENANCE <i>watering cans, "Weedeater" or lawn trimmers, manure (optional)</i></p>

Background Information

Stream banks need a good diversity of plant species to provide a variety of foods, cover types, and habitats for aquatic organisms, birds and wildlife. Both deciduous and coniferous species are important. Deciduous trees like black cottonwood grow rapidly and begin to enhance a stream quickly. Coniferous trees like red cedar grow more slowly, but will enhance a stream long after you and the cottonwoods have disappeared. A mixture of coniferous and deciduous plants ensures a year-round supply of leaf litter for a diverse community of aquatic insects.

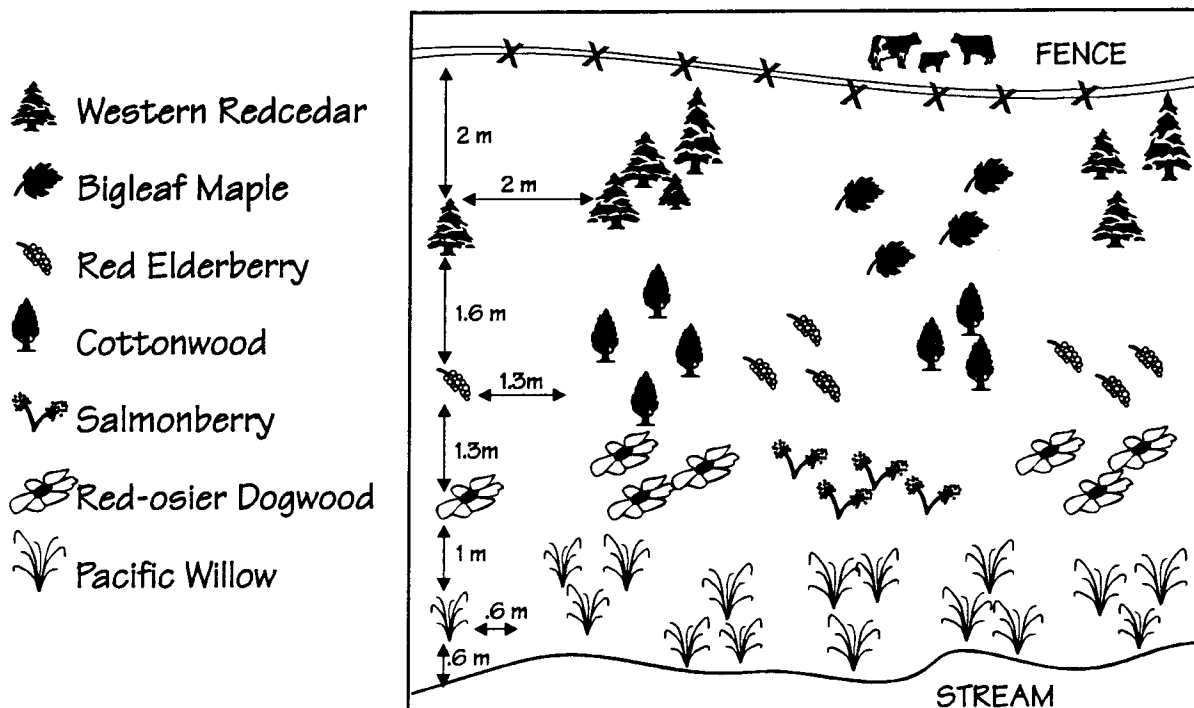
Native species common on British Columbia stream banks are listed in Appendix 1, along with habitat requirements and propagation methods. Some species require special methods or extra care for successful propagation.

Each species has a definite preference for either wetland or upland conditions (Figure 2). The system shown in Table 3 is one way of classifying plants according to their suitability as stream bank species. Choose some species for close to the stream (WET, FACW, FAC) and some for further away (FAC, FACU, UPL). For example, willows prefer wetter sites, whereas Douglas firs prefer drier soil.

WET	<i>obligate wetland: almost always occurs in wetlands</i>
FACW	<i>facultative wetland: usually in wetlands, occasionally in non-wetlands</i>
FAC	<i>facultative: equally likely to occur in wetlands or non-wetlands</i>
FACU	<i>facultative upland: usually occurs in non-wetlands</i>
UPL	<i>obligate upland: almost always found in non-wetlands</i>

Planting projects usually include willow and cottonwood. These species are common along streams throughout the province. They are very easy to propagate from cuttings and grow very quickly. You also can plant seedlings of other species. Nature will introduce new species over time, especially herbaceous plants, mosses, and other simple plants. You may need to control the growth of species such as blackberry and hard hack that can be invasive to the point of taking over.

Figure 2 Sample Planting Plan



Work out a planting plan on paper ahead of time. This will make the actual planting easier, because you will know how many of each species you need and where to plant them. Consider the habitat requirements of the plants when you work out spacing and arrangement. Figure 2 shows a sample planting plan. The spacing in this sample is to be used as a general guide only.

Your planting project should mimic natural growth along the stream. For example, many species grow in clumps. Copy the species and natural spacing patterns that you see at an undisturbed site, or ask a naturalist or landscaper for advice.

Procedure

The procedure involves four steps:

- Step 1. Planning the Project
- Step 2. Obtaining Plant Stock
- Step 3. Planting Your Site
- Step 4. Follow-up Care

Step 1. PLANNING THE PROJECT

Select the area you wish to rehabilitate. Obtain any necessary approvals at least two months before you plan to plant. You will know good locations already if you have done the Introductory Stream Habitat Survey (Module 1).

Plant any steep, bare slopes with a grass seed mixture designed to control erosion. Check with a local nursery, municipal engineering department, or the Ministry of Transport and Highways for recommendations. Arrange to fence the stream bank before you start planting if livestock have access to the stream. See Module 8 for instructions.

Examine undisturbed areas of the stream or other streams nearby. Choose tree and shrub species that grow well in the area. Appendix 1 and the references listed at the end of this module provide guides to native species. Make a planting plan for your site.

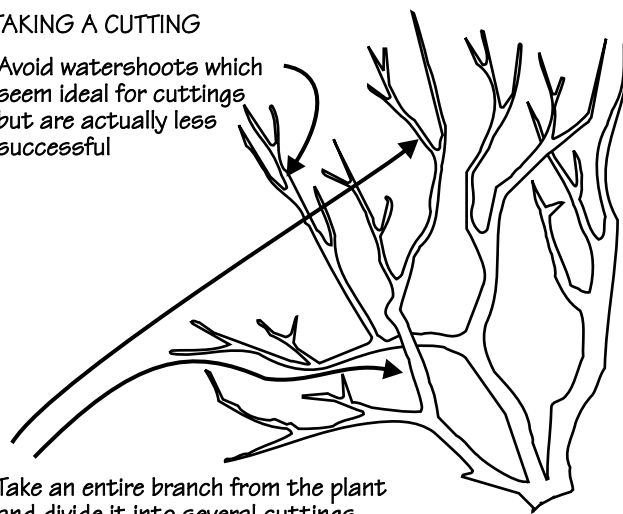
Figure 3 *Taking a Cutting, What the Cutting Looks Like*

from the King County Department of Public Works

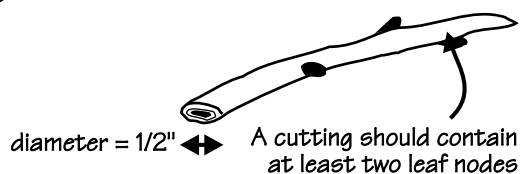
TAKING A CUTTING

Avoid watershoots which seem ideal for cuttings but are actually less successful

Take an entire branch from the plant and divide it into several cuttings of an appropriate size.



WHAT THE CUTTING LOOKS LIKE



Some species are hard to identify without their leaves. Willows, for example, are the only plants with both single bud scales and alternate buds (Figure 3). You may wish to identify and tag suitable plants during summer or autumn, and return to take cuttings in the winter.

Step 2. OBTAINING PLANT STOCK

a) Propagating Cuttings:

Cottonwood (*Populus trichocarpa*) and willow (*Salix* spp.) are the easiest to propagate from cuttings. Use native species such as the Pacific willow (*Salix lasiandra*) or pussy willow (*Salix* spp.), not the introduced weeping willow. You may find it frustrating to start other species from cuttings, and probably need to follow special instructions for individual species. The success rate for cuttings of other species can be less than 50%. Gardening books such as Kruckeberg (1982) and Spurr (1980) provide information on propagating plants. These other species are worth trying because they create more species diversity on the stream bank. Appendix 1 includes propagation methods for many native species.

Collect cuttings from several trees over a wide area and take 5% or less of the stock (1 in 20). This keeps you from depopulating natural areas and ensures genetic variability in the plant material. Pruning also improves the vigour of the parent plants.

You can take softwood cuttings from spring through early fall, when plants are not dormant. This method works well for several species, but is beyond the scope of this module. Consult a reference such as Spurr (1980) for instructions for specific plant species.

Take hardwood cuttings while the plants are fully dormant, in January and February. Choose normal, healthy growth from young trees or shrubs. Cuttings from weak thin shoots, abnormally thick shoots, or older plants do not root well. Cut the previous season's growth with sharp pruning shears (Figure 3). The previous year's growth is the area above the terminal bud scar, the circular scar all around the branch. Select branches about 1 cm in diameter and cut the bottoms at a 45-degree angle, just below a leaf node or bud.

Trim off the tops of the cuttings at a slight angle. Cuttings should be 20 to 40 cm long (8 to 16 inches), with at least two or three healthy buds. Bundle them in groups of twenty-five, with an elastic band near the bottom, so you can recognize the bottoms at planting time. When you are working at temperatures above freezing, keep the cuttings moist by placing them in a wet burlap sack as you collect them. This is not practical or necessary in subzero weather.

Method 1 - Planting cuttings right away: In milder parts of the province, you can plant the cuttings immediately. Store them, right side up, in a 22 litre bucket one-third full of water, for up to 48 hours. Take the cuttings to the site in the bucket. Plant the cuttings following Step 3 and pour the water from the bucket over them.; it contains natural rooting hormones that have leached out of the plants.

Method 2 - Storing, then propagating the cuttings: Where the climate is harsh, store the bundled cuttings in plastic bags. Squeeze out the excess air and seal the bags. Store them in a freezer or fridge until

you are ready to root them. When the ground thaws, you can plant them directly in the soil, or start them in a greenhouse or cold frame. In mild coastal climates, you can store the cuttings by burying them in frost-free soil in your back yard until you are ready to plant them. Root the cuttings in pots or in styroblocks with 45 cavities (called 6-15's in nurseries). Fill the cavities with damp potting soil. Push the cuttings to the base of the cavities, then pull them up 1 to 2 cm so you do not expose the bottoms to air. Bury half or more of each cutting, leaving one bud above and one or more below soil level. Water the cuttings well, then put the blocks into a sunny area of a garden or cold frame. Keep them moist. When leaves and good root system have developed, in two to three months, cuttings are ready to transplant to the stream bank.

b) Planting Seeds:

You can grow many species from seed collected in the wild or purchased from suppliers. However, this takes up to two years and requires a green house in most parts of the province.

Collect seeds from plants near your proposed site that are adapted to local conditions. Take 5% or less (1 in 20) of the native stock, so you do not disrupt the area. If you order seeds from a supplier, use the scientific names to ensure you get native species. Some seeds require special conditions before germination. Kruckeberg (1982) provides information on growing native species from seed.

c) Purchasing Plants:

Make sure you buy native species adapted to local conditions. Buy two-year-old acclimated plants, so you can plant them outside immediately. Acclimate greenhouse plants before you plant them.

You can use one-year-old plants where the climate is mild. Where the climate is harsher, grow one-year-old plants for another year before planting them. Sometimes you can find inexpensive conservation-grade plants.

d) Transplanting or Salvaging Native Plants:

Consider salvaging native plants from an area threatened by land development. Obtain permission from the owners and remove only those plants threatened by bulldozers. Dig up plants on a wet cloudy day during the dormant season, when the ground is not frozen.

Use a very sharp flat-blade spade to dig out the root ball in a 30 cm (1 foot) radius around the plant stem. Wrap the root ball in burlap and tie it around the stem. Store the plants with their rootballs in moist sawdust or mulch to protect them from harsh weather. You can store them this way for several months. The King County guide to native plant propagation describes how to build a capillary bed, which is an easily constructed holding facility for salvaged plants. Volunteer groups in a few locations in the province have built capillary beds. Ask

your Community Advisor if there is this type of facility near you.

Please do not transplant native plants from areas that are not slated for development. You may accidentally depopulate an area, transplant at the wrong time of year, or even disturb an endangered species. If you still choose to transplant, take 5% or less (1 in 20) of the plants of that species, leave lots of seed at the site, and be sure to remove them at the right time of year.

Step 3. PLANTING YOUR SITE

Work on a cloudy or damp day to avoid drying out roots and killing the plants. On a rainy day, you do not need to water the plants! Explain procedures well to volunteers before you start. You can colour code the plan, stakes, and plants using a different colour of flagging tape and label for each species.

Choose the location for each plant very carefully. Make sure you can dig the soil at the site. Arrange stakes on the site according to the planting plan. You may need to bring extra soil if the banks have rip rap. Avoid sites that have permanent standing ground water within a few inches of the soil surface. Many riparian plants survive temporary flooding, but permanent water will drown the roots. Willow is the one exception - it prefers wet soil conditions so is planted closest to the stream.

Method 1 - Planting unrooted cuttings immediately

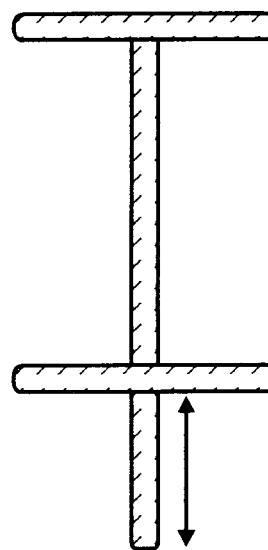
Use this method for willow and cottonwood cuttings. Clear away weeds and grass from an area 1 metre in diameter. Use a dibble, a simple planting tool. (Figure 4) Push it into the ground, at least half as deep as the length of the cutting. Drop the cutting into the base of the hole and push it down a little. Leave one healthy bud above the soil surface to sprout leaves. The buds below the surface will sprout roots. Tamp the cutting in place by pushing the tool into the ground 5 cm away, then pressing toward the cutting. This fills air pockets and surrounds the cutting with damp soil. Water the cutting with the reserved water in the bucket. Place a rodent guard around the stem of each plant and press it into the soil. Use a commercially available mouse guard or aluminum foil. A sturdy wire mesh guard will deter beavers. You may wish to place a piece of landscape cloth around the cutting to inhibit weed growth.

Method 2 - Transplanting rooted cuttings or seedlings

Use this method for any plants growing in styroblocks or pots. Clear away weeds and grass from an area 1 metre in diameter. Dig a hole about half again as large as the diameter, and deeper than the rootball of the plant. Dig up the soil at the bottom of the hole. Hold the seedling over the hole and “tease” the rootball gently with your fingers so that some soil falls into the hole. Place the plant in the hole so that the top of the rootball is just below ground level. Pack the soil firmly

Figure 4
Dibble
Planting Tool

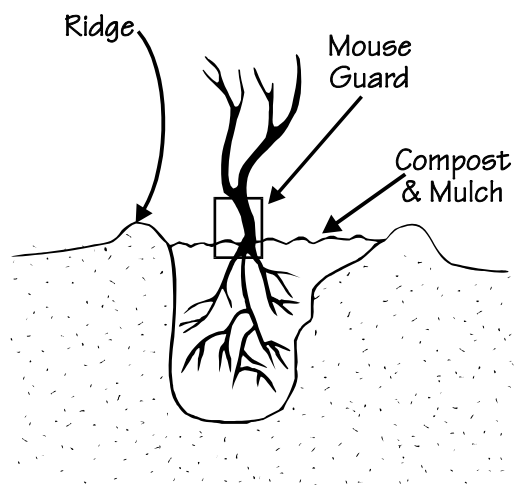
*Weld metal rods at
Cross points shown*



*30 cm or ½ the
length of the cuttings*

around the plant, covering all roots. Build a ridge of soil around the plant, 0.5 m in diameter and 10 to 15 cm high, to collect moisture (Figure 5). On slopes, build a berm or short wall of soil on the downhill side.

Figure 5
A Rooted, Planted Cutting



You may wish to place a piece of landscape cloth around the plant to inhibit weed growth. You can add a scoop of composted mulch on top of the cloth to hold in moisture. This is optional but beneficial. Water the plant well with 8 to 12 litres of water, unless it is raining. Mark the plant with a stake, so no one tramples it and you can find it easily later.

Step 4. FOLLOW UP CARE

Check your site every week or two from July to September, or until the first heavy rains of autumn. Water the plants well and remove competing weeds and grasses until the plants become well established. Check the mouse guards periodically. You may need to plant again if only a few seedlings survive. Plan on routine summer maintenance for the next two to three years.

Collecting, Reporting, and Evaluating Information

Complete the Streamside Planting Summary Sheet and send it to the Streamkeepers Database. The current address is in the Handbook.

Take photographs or videos before and after planting, and in successive years. Keep a record of your site plan, and make notes on the success of different species. You can evaluate your project further. For example, you can monitor improvements in water quality (Module 3), aquatic invertebrates (Module 4), and fish (Module 11) by sampling before you start the project and in successive years.

Public Relations

You can clean up streams, monitor their condition, and undertake enhancement projects, but you need the support of your community for these projects to succeed. Talk about your project with others whenever and wherever you can, including at schools and public meetings. Place signs at visible projects. Contact newspapers, radio stations and television stations. Module 10 contains specific information about increasing community awareness and working with the media.

References and Useful Resources

Adopt-A-Stream Video (available from Community Advisors)

Cowardin, L.M., V. Carter, F.H. Golet and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish & Wildlife Publication FWS/OBS-79/31. Washington, DC.

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Johnson, A.W. and J.M. Stypula (editors). 1993. *Guidelines for Bank Stabilization Projects in the Riverine Environments of King County*. King County Dept. of Public Works, Surface Water Management Division, Seattle, WA.

The Stewardship Series

King County Department of Public Works - Surface Water Management Division. *Northwest Native Plants Identification and Propagation for Revegetation and Restoration Projects*.

Available from:

King County Surface Water Management Division,
700 Fifth Ave., Suite 2200
Seattle, WA 98104

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Pojar, J. and A. MacKinnon. 1994. *Plants of Coastal British Columbia*. Lone Pine Publishing, Vancouver BC, 527 pp.

Spurr, J. (editor) 1980. *Cuttings Through the Year*. Univ. Washington Arboretum, Seattle, WA.

Thurston Conservation District. *A Guide to Stream Corridor Revegetation in Thurston County*. Thurston Conservation District, Dobbs Creek Model Farm, Olympia, WA.

U.S. Army Corps of Engineers, Seattle District. 1993. *Wetland Plants of the Pacific Northwest*. Available from:

Government Bookstore,
1305 SW First Ave.,
Portland OR. 97201-5801

Appendix

Appendix 1: Native Species Suitable for Riparian Vegetation Projects

Appendix 1: Native Species Suitable For Riparian Revegetation Projects

(the information for this table was compiled from C.P. Lyons, Thurston Conservation District manual, King County manual)

Codes:

COASTAL/	SUN/	WETLAND/
INLAND	SHADE	UPLAND
<i>c</i> = coastal	<i>s/</i> = sun	<i>upl</i> = obligate upland
<i>i</i> = inland	<i>/s</i> = shade	<i>facu</i> = upland/some wetland
	<i>ps</i> = part shade	<i>fac</i> = upland + wetland
		<i>facw</i> = wetland/some upland
		<i>wet</i> = obligate wetlands

PROPAGATION METHODS

Willow and poplar cuttings and two year old seedlings of many species are the easiest to propagate. Establishing cuttings of other species and starting plants from seed can be difficult. Seek advice from an experienced gardener and consult gardening books by Kruckeberg and Spurr.

Common Name (scientific name)	Coastal/ Inland	Sun/ Shade	Wetland/ Upland	Propagation method
TALL CONIFEROUS TREES				
Douglas fir (<i>Pseudotsuga menziesii</i>)	<i>c/i</i>	<i>s/ps</i>	<i>upl</i>	<i>seed</i> , transplant
Sitka spruce (<i>Picea sitchensis</i>)	<i>c</i>	<i>s/s</i>	<i>fac</i>	<i>seed</i> , transplant
Western Hemlock (<i>Tsuga heterophylla</i>)	<i>c/i</i>	<i>/s</i>	<i>facu</i>	transplant, <i>seed</i>
Western Red Cedar (<i>Thuja plicata</i>)	<i>c/i</i>	<i>/s</i>	<i>fac</i>	transplant, <i>seed</i>
TALL DECIDUOUS TREES (>50 Feet)				
Big Leaf Maple (<i>Acer macrophyllum</i>)	<i>c/i</i>	<i>s/ps</i>	<i>facu</i>	<i>seed</i> , transplant
Black Cottonwood (<i>Populus trichocarpa</i>)	<i>c/i</i>	<i>s/</i>	<i>fac</i>	cutting, <i>seed</i> , transplant
Quaking Aspen (<i>Populus tremuloides</i>)	<i>i</i>	<i>s/</i>	<i>facw</i>	<i>seed</i> , sucker
Red Alder (<i>Alnus rubra</i>)	<i>c</i>	<i>s/s</i>	<i>fac</i>	<i>seed</i> , cutting, sucker,
SHORT DECIDUOUS TREES (15 - 60 Feet)				
Bitter Cherry (<i>Prunus emarginata</i>)	<i>c</i>	<i>S/ps</i>	<i>facu</i>	<i>seed</i> , transplant
Black Hawthorn (<i>Crataegus douglasii</i>)	<i>c/i</i>	<i>s</i>	<i>fac</i>	<i>seed</i> , transplant
Cascara (<i>Rhamnus purshiana</i>)	<i>c</i>	<i>s/s</i>	<i>fac</i>	cutting, <i>seed</i> , transplant
Crabapple (Pacific) (<i>Malus diversifolia</i>)	<i>c</i>	<i>s/</i>	<i>fac</i>	<i>seed</i>
Mountain Alder (<i>Alnus tenuifolia</i>)	<i>i</i>	<i>s/</i>	<i>facw</i>	<i>seed</i> , transplant
Oso Berry or Indian Plum (<i>Osmaronia cerasiformis</i>)	<i>c</i>	<i>s/s</i>	<i>upl</i>	transplant, <i>seed</i> , cutting
Red Elderberry (<i>Sambucus racemosa v. arborescens</i>)	<i>c</i>	<i>s/ps</i>	<i>facu</i>	cutting, <i>seed</i>
Vine Maple (<i>Acer circinatum</i>)	<i>c</i>	<i>/s</i>	<i>facu</i>	<i>seed</i> , transplant
Water or Black Birch (<i>Betula occidentalis</i>)	<i>c/i</i>	<i>s/s</i>	<i>wet</i>	<i>seed</i> , transplant
White or Paper Birch (<i>Betula papyrifera</i>)	<i>c/i</i>	<i>s/</i>	<i>facu</i>	<i>seed</i> , transplant
Willows: Pacific (<i>Salix lasiandra</i>), Sitka (<i>S. sitchensis</i>) Scouler's (<i>S. scouleriana</i>), Sitka (<i>S. sitchensis</i>)(many called pussy willow)	<i>c/i</i>	<i>s/</i>	<i>facw/wet</i>	cuttings

The Stewardship Series

Common Name (Scientific Name)	Coastal/ Inland	Sun/ Shade	Wetland /Upland	Propagation method
SHRUBS (2 - 15 FEET)				
Blueberry, Huckleberry (<i>Vaccinium</i> spp.)	c/i	s/s	upl	seed, cutting, sucker
Douglas, Rocky Mtn maple (<i>Acer glabrum</i>)	c/i	/s	facu	seed, transplant
Gooseberries (<i>Ribes</i> spp.)	c/i	s	fac	seed, cutting, layer
Hudson Bay currant (<i>Ribes</i> spp.)	i	s	fac	seed, cutting, layer
Mock Orange (<i>Philadelphus gordonianus</i> , <i>P. lewisii</i>)	c	s/s	fac	cutting, layer
Ninebark (<i>Physocarpus capitatus</i>)	c	s/s	fac	cutting
Nootka or Wild Rose (<i>Rosa</i> spp, <i>R. nutkana</i>)	c/i	s/ps	fac	cutting, sucker, seed
Red Osier Dogwood (<i>Cornus stolonifera</i>)	c/i	s/s	facw	cutting, seed layer
Salal (<i>Gaultheria shallon</i>)	c	s/	upl	transplant, seed
Salmonberry (<i>Rubus spectabilis</i>)	c	s/s	fac	cutting, transplant
Service or Saskatoonberry (<i>Amelanchier</i> spp.)	c/i	s/	facu	sucker, seed
Sitka Alder (<i>Alnus sinuata</i>)	c/i	s/s	facw	seed, cutting, sucker
Snowberry (<i>Symphoricarpos albus</i>)	c/i	s/s	facu	cutting, transplant
Snowbrush (<i>Ceanothus velutinus</i>)	i	s/	upl	cutting, transplant
Spiraea or Hardhack (<i>Spiraea douglasii</i>)	c/i	s/s	facw	sucker, cutting
Tall Oregon Grape (<i>Berberis aquifolium</i>)	c/i	s/s	upl	cutting, layer
Thimbleberry (<i>Rubus parviflorus</i>)	c/i	/s	facu	cutting, transplant
Twinberry (black) (<i>Lonicera involucrata</i>)	c/i	/s	fac	cutting, seeds
Twinberry (red) (<i>Lonicera utahensis</i>)	i	/s	facu	cutting, seeds

Soil moisture characteristics and site conditions to consider when choosing plant species:

These recommendations are taken from Johnson and Stypula, 1993.

Very Droughty Soils: Use UPL and FACU species. These conditions may be expected in porous or well-drained (sandy) soils or high on the bank, especially on south or west facing banks with little shade.

Droughty Soils: Use mostly UPL and FACU species; FAC species may be used occasionally if site conditions are somewhat moist. These soils occur in areas similar to very droughty soil, but where moisture retention is better (e.g. less sandy soils, shade, and north or east facing banks).

Moderate Soils: Use FACU, FAC, and FACW species. They are loamy soils with some clay, on level areas to steep slopes. They may be shallow soils over hardpan, or areas where seeps are common. Plant selection should consider microclimatic conditions, including seeps, slope, aspect, etc. Steeper slopes, for example, will be drier than level soils because of water run off.

Wet Soils: Use mostly FAC and FACW species; WET species can be used in particularly wet areas as long as the soil is not compacted... (usually) these soils consist of nearly level silt loams. They retain water rather than allowing it to run off after rain, and are moist to wet for most or all of the year. Because these areas have minimal slope and typically slow-moving streams, erosion is seldom a problem.

Very Wet Soils: Use FACW and WET species. These soils may be found along meandering rivers and streams with low banks. There is typically a high water table that allows the development of organic soils (peat and mucks). They are not well suited to large woody vegetation, as trees tend to blow over. Dense thickets of shrubs and small trees are common. Because these areas have minimal slope and typically slow-moving streams, erosion is seldom a problem.

The Stewardship Series

send the data to: *Streamkeepers Database, Department of Fisheries and Oceans,
Suite 400, 555 W. Hastings Street, Station 321, Vancouver, B.C. V6B 5G3
or fax to (604) 666-0292*

Streamside Planting Summary Sheet

(use a new data sheet for each site planted)

Module 7

Stream Name/Nearest Town	Date
	Watershed code
Organization name	Stream Segment #
Contact name	Crew size
	Phone #

Upstream limit of work (directions, distance to known landmark)
Downstream limit of work (directions, distance to known landmark)

Details of streamside planting
Source of stock (cuttings, nuresery seedlings, seed, salvaged plants)
Species planted and number of each species
Additional comments (why the planting was done, etc.)