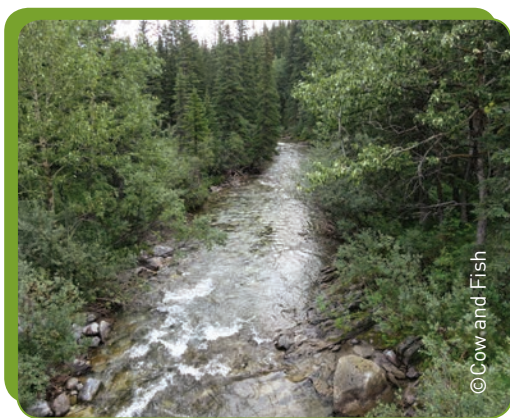




PLANNING YOUR RIPARIAN PLANTING PROJECT IN ALBERTA

What is a Riparian Area and How Does It Benefit You?

Riparian areas are found next to water, including stream and river floodplains, lakeshore and wetland habitats. Plants that grow in riparian areas are strongly adapted to moist or flooded conditions. When in a healthy condition, riparian areas trap and filter sediment; slow erosion and prevent loss of land; slow and absorb floodwater; recharge aquifers; absorb nutrients; and provide shade and food for fish, wildlife and livestock. All of these ecological functions help to protect water quality, maintain biodiversity, alleviate flood damage and prepare us for droughts. There are many reasons to keep your green zones next to your stream, river, lake or wetland, intact and healthy!



Is Your Riparian Area in Trouble? What is the Root Cause of the Problem?

Signs that your riparian area may be in trouble are accelerated rates of eroding or slumping banks, dead or dying woody plants, degraded water quality and an increase in exposed soil and weeds. Before deciding on what to do to address these symptoms, it is important to first understand the root cause of the problem.

This requires looking at how your riparian area is being managed and how it is being influenced by the surrounding landscape and conditions upstream in your watershed.



To help determine what is contributing to degraded riparian health, consider these questions:

- What land use activities are occurring in the riparian area and are they being managed sustainably?
- Are there dams, diversions, culverts or artificial water inputs upstream of your site?
- What is the condition of the surrounding uplands? Are you adequately conserving soil and water resources in your uplands? Is there a sufficient buffer between agricultural croplands, hayfields or developed areas and your riparian area?

Riparian areas require careful management to maintain their health and function. Often, changing the timing and intensity of how riparian areas are used, is the first step in addressing the cause of the problem. Riparian areas need rest from use and should be left undisturbed early in the season when soils are saturated and easily damaged by vehicles, animals or people. Careful attention to livestock stocking rates is another key consideration.



For any riparian area to function effectively it must have access to water. Upstream dams, diversions, berms, improperly sized culverts or channel dredging can prevent natural moisture replenishment in your riparian area. Until these concerns are adequately addressed, riparian restoration projects may prove unsuccessful. Flooding is an important aspect in recharging groundwater and maintaining riparian vegetation.

Riparian areas alone (no matter how healthy) cannot protect our water sources from improper, intensive upland management practices. Riparian plants have limited filtration ability. Upland practices that cause soil erosion or high levels of contaminated surface runoff, put our water quality at risk.

When is Riparian Planting Appropriate?

Riparian plantings can be used to improve degraded fish and wildlife habitat and for erosion control or bank stabilization purposes. The right selection of plants can also be useful for improving natural bio-filtration and sediment trapping functions.

Letting nature do the work....

Before investing money, time and effort into a riparian planting project, first assess **natural recovery options**. If rested from disturbance, native plants will naturally re-establish with time and patience, sometimes faster than you will be able to plant and successfully grow them. Simply excluding livestock or other human-caused disturbance may be the best strategy to kick-start the natural recovery process. Fencing is one way to accomplish this. It may take a few years for your site to recover depending on its condition. Natural recovery works best where there are still healthy riparian areas nearby to provide a seed or root source of beneficial native plants. Protecting remnant native plants from disturbance will help bolster your restoration efforts. Riparian sites with a high water table or subject to frequent flooding usually have the best chance at making a quick recovery.



2000



2007



2011

Drywood Creek natural recovery progression from 2000 to 2011 in response to improved grazing management (i.e. improved livestock distribution; reduced stocking rate; and change from winter to summer use)



Developing a Riparian Planting Strategy for Your Site

After 1) evaluating the root cause of the problem; 2) assessing natural recovery options; and 3) deciding that riparian plantings will benefit your riparian area it is important to develop an appropriate riparian planting strategy. Remember to consider the following:

A) IDENTIFY THE FACTOR(S) OR FUNCTION(S) OF THE RIPARIAN AREA THAT YOU WISH TO IMPROVE

For example:

- ☐ Bank stability
- ☐ Tree and shrub wildlife habitat
- ☐ Erosion control
- ☐ Streambank shading
- ☐ Bio-filtration capacity
- ☐ Other_____

Your riparian planting goals should be based on restoring key riparian functions. To understand what pieces of your riparian area are missing, you may wish to conduct a Riparian Health Assessment. Contact Cows and Fish for more information (www.cowsandfish.org; riparian@cowsandfish.org; 403-381-5538).

B) MOISTURE LIMITATIONS


Without adequate moisture, new plantings will fail. Moisture is especially critical during the first year before plant roots fully develop. If you have a high water table or your site is frequently saturated during high flows, moisture will not be limiting. In other situations, you may need to irrigate plantings during the first growing season unless you have adequate rainfall.

If moisture is limited:

- Apply weed-free wood chips or bark mulch around plantings.
- Avoid planting in mid-summer. It is best to plant early in the spring or fall.
- Use large plant material that can access the water table during the first summer (this could include rooted plants or deep planted cuttings of appropriate size).
- Install a solar-powered water pump irrigation system (with appropriate approvals or permits).
- Select appropriate plant material suited to the moisture conditions of your site (see below for more information).

C) SOIL CONDITIONS

Understanding soil conditions prior to developing your planting plan will help inform what species to plant. Keep in mind that not all sites will support trees or shrubs. For example, highly saline or alkaline riparian sites and rapidly drained riparian sites with only early season moisture may be unsuitable for tree and shrub plantings. Also, soils that are compacted or rocky may require specialized planting equipment. Various types of soil tests can be done to determine pH, nutrient availability, texture and composition. Depending on your soil test results, you may need to apply a soil amendment mix to give plantings a boost during their first growing season (e.g. a mix of peat moss/compost, organic fertilizer, humate complexes and mycorrhiza fungi).



Consult with a soil bioengineering professional if you are attempting to remediate actively slumping banks or steep banks (i.e. a slope greater than 1 horizontal to 4 vertical).

D) COMPETITION FROM WEEDS AND AGGRESSIVE GRASSES

Riparian planting projects can fail if the plantings are overwhelmed by competition from weedy and aggressive herbaceous plants like reed canary grass, smooth brome or timothy. Knowing what plants are presently growing in and adjacent to your proposed planting site will help determine in advance what challenges you may face. If weeds and other competitive plants are a concern, consider using mature, rooted plant stock (e.g. potted plants or tree transplants with large root balls) to give plantings a competitive edge.

Before you plant:

- Assess the site for weeds and other plants that may be a competitive threat; and
- Contact your local Agricultural Fieldman (<http://www.aaaf.ab.ca/>) to help determine the most appropriate weed management approach.

Weed monitoring and control should be done for at least 3 years after installing your plantings.

E) WILDLIFE OR LIVESTOCK BROWSE

New plantings are readily susceptible to damage from rodents, beaver, wild ungulates (e.g. moose, deer, elk) and livestock. If browse pressure is a concern, temporary or permanent fences or cages can be placed around woody plantings. Where rodent damage is an issue, plastic mesh or tubing can be placed around the base of your woody plants to prevent stem girdling.

What Permits or Approvals Do I Need?

Working in or near a water body generally requires at least two provincial approvals (*Public Lands Act, Water Act*), and possibly approval from Fisheries and Oceans Canada (*Federal Fisheries Act*).

Permits or approvals may be required for riparian planting projects in the following situations:

- If plant material will be harvested for the project and harvest will occur on Public Land. Contact your local Alberta Environment and Sustainable Resource Development (ESRD) Forestry Office for more information: <http://esrd.alberta.ca>

- If your project will entail bank or shoreline soil bioengineering or erosion control works. Contact your local ESRD office for more information about *Water Act* approvals. Fisheries Act approvals are generally not required for riparian habitat restoration projects, provided there is no new fill installed below the High Water Mark and your project does not completely obstruct fish passage during sensitive timing windows. In addition, appropriate measures must be in place for erosion and sediment control. For more information: <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>



What to Plant?

Choosing which riparian plants are appropriate for your site is vital to the success of your riparian restoration project. Here are some important questions to ask: 1) Which species will grow well in your area? 2) Which species will provide the most benefit for riparian function? and 3) Which species are easy to establish and grow quickly?

Important Plant Selection Considerations:

1) Use Locally Adapted Native Species

- Local plants and seeds are best adapted to local climatic fluctuations, soil conditions, pollinators, and predator or disease stresses.
- Where possible, and with appropriate approval, harvest live plant material (seeds, cuttings or rooted plants) from a similar 'donor' site along the same water body. Take precautions not to damage the donor site (i.e. collect only 5% of the seed or plant material scattered over as large an area as possible).
- Select pioneer rather than later successional species. For example, willows and poplars are considered 'pioneer' species that are the first to establish in a disturbed area. White spruce is an example of a slow growing, later successional species.
- Select plant species that are adapted to your soil type, aspect, and moisture conditions.
- For soil bioengineering projects, use live tree and shrub cuttings from willows, balsam poplars and red-osier dogwood. These species are capable of vegetative propagation (i.e. they grow shoots and roots when stem cuttings are placed in contact with soil and moisture). For more information refer to the Cows and Fish "Growing Restoration" Fact Sheet (available from: <http://www.cowsandfish.org>).

For a list of willow species that are best suited to your location, refer to the table on the next page.

- Select a diversity of plants to provide short, medium and tall structural height layers and varying rooting depths.
- To find a native plant nursery near you (including seed stock) refer to the Alberta Native Plant Council's Native Plant Source List (<http://www.anpc.ab.ca/content/resources.php>). Contact your local native plant supplier well in advance to allow enough time for harvest and propagation of native species!

2) Prevent the Spread of Weeds, Invasive Ornamentals and Non-Native Competitors

- Refer to the Alberta Invasive Species Council (<https://www.abinvasives.ca/>) for more information about Alberta's regulated Prohibited Noxious and Noxious Weeds and other invasive plants of concern.
- Avoid planting invasive non-native shrubs including: caragana, Russian olive, salt cedar and European (common) buckthorn.
- Avoid using sod-forming grasses (e.g. smooth brome, timothy, reed canary grass) that can quickly overwhelm tree and shrub seedlings.

3) Ensure All Plant Material is Alive and Healthy (i.e. Disease and Pest Free)

4) Select Plants with Beneficial Traits

Selecting the right mix of plants for your site will in part depend on the riparian functions you hope to restore, such as:

- Shading (trees and shrubs help to create cover and shelter for fish and wildlife);
- Erosion resistance (willows, poplars and sedges in combination offer high erosion resistance);
- Wildlife values (consider using berry producing shrubs like saskatoon and plants with high forage value such as red-osier dogwood and willows); and
- Nutrient filtration (sedges, willows and cattails efficiently absorb and utilize nutrients).



Common Native Riparian Shrubs of Alberta, By Natural Region

(Source: Cows and Fish Riparian Health Database)

NATURAL REGION	WILLOW SPECIES	OTHER SHRUBS
Grassland (n=589)	sandbar willow (<i>Salix exigua</i>)	silverberry (<i>Elaeagnus commutata</i>)
	yellow willow (<i>Salix lutea</i>)	choke cherry (<i>Prunus virginiana</i>)
	beaked willow (<i>Salix bebbiana</i>)	thorny buffaloberry (<i>Shepherdia argentea</i>)
	peach-leaved willow (<i>Salix amygdaloides</i>)	saskatoon (<i>Amelanchier alnifolia</i>)
	false mountain willow (<i>Salix pseudomonticola</i>)	red-osier dogwood (<i>Cornus stolonifera</i>)
		water birch (<i>Betula occidentalis</i>)
Parkland (n=458)	sandbar willow (<i>Salix exigua</i>)	silverberry (<i>Elaeagnus commutata</i>)
	beaked willow (<i>Salix bebbiana</i>)	red-osier dogwood (<i>Cornus stolonifera</i>)
	yellow willow (<i>Salix lutea</i>)	choke cherry (<i>Prunus virginiana</i>)
	false mountain willow (<i>Salix pseudomonticola</i>)	saskatoon (<i>Amelanchier alnifolia</i>)
	basket willow (<i>Salix petiolaris</i>)	water birch (<i>Betula occidentalis</i>)
	flat-leaved willow (<i>Salix planifolia</i>)	Canada buffaloberry (<i>Shepherdia canadensis</i>)
	velvet-fruited willow (<i>Salix maccalliana</i>)	wild red raspberry (<i>Rubus idaeus</i>)
Boreal (n = 275)	basket willow (<i>Salix petiolaris</i>)	wild red raspberry (<i>Rubus idaeus</i>)
	beaked willow (<i>Salix bebbiana</i>)	red-osier dogwood (<i>Cornus stolonifera</i>)
	flat-leaved willow (<i>Salix planifolia</i>)	bog birch (<i>Betula glandulosa</i>)
	pussy willow (<i>Salix discolor</i>)	river alder (<i>Alnus tenuifolia</i>)
	yellow willow (<i>Salix lutea</i>)	silverberry (<i>Elaeagnus commutata</i>)
	Mackenzie's willow (<i>Salix prolixa</i>)	saskatoon (<i>Amelanchier alnifolia</i>)
	sandbar willow (<i>Salix exigua</i>)	dwarf birch (<i>Betula pumila</i>)
	velvet-fruited willow (<i>Salix maccalliana</i>)	low-bush cranberry (<i>Viburnum edule</i>)
	balsam willow (<i>Salix pyrifolia</i>)	northern gooseberry (<i>Ribes oxycanthoides</i>)
	false mountain willow (<i>Salix pseudomonticola</i>)	wild red currant (<i>Ribes triste</i>)
	Drummond's willow (<i>Salix drummondiana</i>)	bracted honeysuckle (<i>Lonicera involucrata</i>)

Listed in order of abundance. Excludes increaser shrubs such as rose, buckbrush and snowberry.



Selecting Appropriate Riparian Plants to Meet Your Moisture Conditions

From Wet to Dry, Common Riparian Plants of Alberta *

EMERGENT / AQUATIC SPECIES

Native sedges:
 awned sedge (*Carex atherodes*)
 small bottle sedge (*Carex utriculata*)
 water sedge (*Carex aquatilis*)
 woolly sedge (*Carex lanuginosa*)

Native rushes:
 creeping spike-rush (*Eleocharis palustris*)
 small-fruited bulrush (*Scirpus microcarpus*)
 great bulrush (*Scirpus validus* / *S. acutus*)
 wire rush (*Juncus balticus*)

Native grasses:
 common tall manna grass (*Glyceria grandis*)

Other:
 Common cattail (*Typha latifolia*)

MOIST SITE SPECIES
 (High water table / flood prone zone)

Native trees:
 balsam poplar (*Populus balsamifera*)

Native willows:
 beaked willow (*Salix bebbiana*)
 basket / meadow willow (*Salix petiolaris*)
 false mountain willow (*Salix pseudomonticola*)
 flat-leaved willow (*Salix planifolia*)
 sandbar willow (*Salix exigua*)
 shining willow (*Salix lucida*) = Pacific willow
 (*Salix lasiandra*)
 yellow willow (*Salix lutea*)

Other native shrubs:
 red-osier dogwood (*Cornus stolonifera*)
 river alder (*Alnus tenuifolia*)
 water birch (*Betula occidentalis*)

Native grasses
 Bluejoint (*Calamagrostis canadensis*)
 fowl bluegrass (*Poa palustris*)
 northern reed grass (*Calamagrostis inexpansa*)
 slough grass (*Beckmannia syzigachne*)
 tufted hair grass (*Deschampsia cespitosa*)
 western wheat grass (*Agropyron smithii*)

DRY SITE SPECIES
 (South aspect / steep bank)

Native trees:
 balsam poplar (*Populus balsamifera*)
 aspen (*Populus tremuloides*)

Native shrubs:

Tall shrubs
 choke cherry (*Prunus virginiana*)
 pin cherry (*Prunus pensylvanica*)
 saskatoon (*Amelanchier alnifolia*)
 silverberry (*Elaeagnus commutata*)




Medium height shrubs
 common wild rose (*Rosa woodsii*)
 northern gooseberry (*Ribes oxycanthoides*)
 wild red raspberry (*Rubus idaeus*)

Short shrubs
 buckbrush / snowberry (*Symphoricarpos occidentalis*)
 shrubby cinquefoil (*Potentilla fruticosa*)


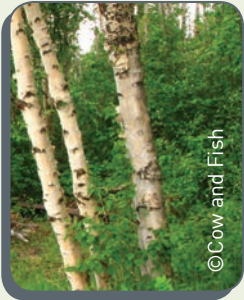
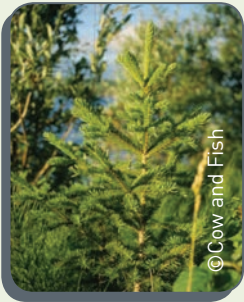
Native grasses:
 green needle grass (*Stipa viridula*)
 western wheat grass (*Agropyron smithii*)

* To choose plants that are best suited to your site, a field assessment of local conditions is strongly recommended. For assistance contact Cows and Fish (www.cowsandfish.org).






TREES		
Plant Species	Ecology	Notes
<p>Balsam Poplar (<i>Populus balsamifera</i>)</p>  <p>Fast growing from cuttings. Flood tolerant.</p>	<p>Balsam poplar is a pioneer, fast growing species that colonizes newly formed point bars (alluvial deposits) along large streams and rivers.</p> <p>Establishment occurs best on sites with loam to coarse sandy, well drained soils.</p> <p>Balsam poplar has extensive roots and spreads by suckering. It tolerates flooding.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Bank stabilization -Fish and wildlife shelter and habitat value -Fair forage value <p>Height class: Tall (up to 25 m)</p> <p>Stock type: Cuttings, plugs, potted plants.</p> <p>Range restrictions: Occurs throughout Alberta at low to medium elevations; uncommon in the southeast.</p>
<p>Trembling Aspen (<i>Populus tremuloides</i>)</p>  <p>Use in open drier riparian sites with well drained gravels or sandy soils. Fast growing from cuttings.</p>	<p>This is a fast growing, colonial, suckering tree with extensive roots. In Alberta, riparian aspen communities grow around prairie potholes (wetlands), marshes, lakeshores and older river terraces on stable, drier soils. Aspen is also common in uplands in Alberta.</p> <p>Aspen grows best in sandy or gravelly loams; it is shade intolerant and usually is replaced by conifer trees as the forest matures. Aspen is not suitable for frequently flooded or saturated soils.</p>	<p>Functions:</p> <ul style="list-style-type: none"> - Soil stabilization -Fish and wildlife shelter and habitat value -Good forage value <p>Height class: Tall (up to 20 m)</p> <p>Stock type: Cuttings, plugs, potted plants.</p> <p>Range restrictions: Occurs throughout Alberta, but is more common in the Parkland and Boreal Natural Regions.</p>
<p>Cottonwood species (<i>Populus deltoides</i>/ <i>Populus angustifolia</i>)</p>  <p>Fast growing from cuttings. Restricted to southern river valleys in Alberta. Flood tolerant.</p>	<p>Plains (P. deltoides) and Narrow-leaf cottonwood (P. angustifolia) are locally abundant in southern river valleys in Alberta's Grassland Natural Region. They are related to balsam poplar, and have similar growth characteristics. Like balsam poplars, they are excellent bank stabilizers and provide important fish and wildlife shelter and habitat.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Bank stabilization -Fish and wildlife shelter and habitat value -Fair forage value <p>Height class: Tall (up to 25 m)</p> <p>Stock type: Cuttings, plugs, potted plants.</p> <p>Range restrictions: Grassland Natural Region, southern Alberta river floodplains (e.g. Milk River, South Saskatchewan River; Red Deer River).</p>







TREES		
Plant Species	Ecology	Notes
<p>Manitoba Maple (<i>Acer negundo</i>)</p>  <p>Commonly used in shelterbelt plantings. Hardy, drought and flood tolerant.</p>	<p>Manitoba maple is considered native in eastern Alberta as far north as the Battle River where it occurs along coulees and river valleys. However, introduced horticultural varieties have been widely planted in other parts of Alberta. Manitoba maple is hardy, drought tolerant and has a wide soil adaptability (but growth is poor on saline and acidic soils). Use of local, native strains is preferred; otherwise use male plants to prevent undesirable spread.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Soil stabilization -Wildlife shelter and habitat value -Poor forage value, except as fall browse for deer <p>Height class: Medium (7 to 12 m)</p> <p>Stock type: Propagated from seed. May be available as plugs or potted plants.</p> <p>Range restrictions: Native to eastern Alberta, as far north as the Battle River.</p>
<p>Paper birch (<i>Betula papyrifera</i>)</p>  <p>Slower growth rate; best suited to calcareous or acidic riparian sites in the boreal, foothills or montane regions.</p>	<p>Paper birch has distinctive, white, peeling bark. In Alberta it grows on moist upland sites together with aspen and white spruce; it also grows in bogs, on lake shores and other poorly drained areas. Paper birch is shade intolerant and grows on acidic to highly calcareous soils. It grows best on well-drained sandy loams, silt soils, or soils derived from limestone. Paper birch readily re-grows in burned or cut forests.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Soil stabilization -Fish and wildlife shelter and habitat value -Fair forage value <p>Height class: Tall (up to 25 m)</p> <p>Stock type: Propagated from seed. May be available as plugs or potted plants.</p> <p>Range restrictions: Common in the Boreal, Foothills and Montane regions of Alberta; occasional in the Parkland.</p>
<p>White spruce (<i>Picea glauca</i>)</p>  <p>Slow growth rate; shade tolerant.</p>	<p>White spruce can occur in riparian or upland sites typically with well drained soils. In north and central regions, low-bush cranberry is often the dominant understory shrub in riparian spruce communities in floodplains and lakeshores. In more poorly drained wetter sites, common horsetail occurs in the spruce understory. In the northern fringe of the Grassland Natural Region and in the Parkland Natural Region, red-osier dogwood is often the dominant understory shrub. White spruce is a slow growing, later successional species that usually establishes in the understory of balsam poplar or aspen forests.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Soil stabilization -Fish and wildlife shelter and habitat value <p>Height class: Tall (up to 40 m)</p> <p>Stock type: Propagated from seed. May be available as plugs or potted plants.</p> <p>Range restrictions: Common in the Foothills, Montane and Boreal Forest Regions; occasional in the Parkland and the northern fringe of the Grassland Natural Region, particularly on north facing slopes of river valleys and coulees</p>



SHRUBS		
Plant Species	Ecology	Notes
<p>Willow species (<i>Salix spp.</i>)</p>  <p>Fast growing from cuttings. Flood tolerant.</p>	<p>Willows are a diverse group of fast growing riparian shrubs that are adapted to frequently flooded conditions. They are excellent bank stabilizers, particularly in combination with sedges (on smaller streams) or poplars (on large rivers). They can be propagated from stem cuttings.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Bank stabilization -Nutrient filtration -Fish and wildlife shelter and habitat value -Good forage value <p>Height class: Medium to tall (variable)</p> <p>Stock type: Cuttings, plugs, potted plants.</p> <p>Range restrictions: Common throughout Alberta. Refer to the previous table for willow species suited to your region.</p>
<p>Red-osier Dogwood (<i>Cornus stolonifera</i>)</p>  <p>Fast growing from cuttings. Occurs throughout Alberta. Flood tolerant.</p>	<p>Red-osier dogwood grows well on stream banks and adjacent floodplains. It is capable of growing in clay loam to sandy loam soils. Red-osier dogwood is valuable for re-vegetation of degraded sites since it is readily established by direct seeding, by transplanting rooted cuttings, or nursery grown seedlings. Its rapid growth quickly stabilizes deteriorated banks. It tolerates full sun if it has sufficient moisture.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Bank stabilization -Nutrient filtration -Fish and wildlife shelter and habitat value -Good forage value <p>Height class: Short to Medium (1 m to 3 m)</p> <p>Stock type: Cuttings, plugs, potted plants.</p> <p>Range restrictions: Common and widespread in all regions.</p>
<p>Saskatoon (<i>Amelanchier alnifolia</i>)</p>  <p>Berry producer; prefers sandy well drained soils.</p>	<p>Saskatoon grows in drier portions of the riparian area; it is not tolerant of annual flooding. It provides excellent nesting habitat for birds and its berries are an important source of food for birds, small mammals and some carnivores. Saskatoon tolerates a broad range of soil types, but does best in well drained, sandy to loamy soils.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Fish and wildlife shelter and habitat value -Good forage value -Soil stabilization -Berry producer <p>Height class: Medium to tall (up to 6 m)</p> <p>Stock type: Plugs, potted plants.</p> <p>Range restrictions: Common and widespread in all regions.</p>



SHRUBS		
Plant Species	Ecology	Notes
<p>Choke Cherry (<i>Prunus virginiana</i>)</p>  <p>Berry producer; prefers sandy well drained soils.</p>	<p>Choke cherry is excellent to use for stabilizing disturbed soil; it reproduces readily from seed and root suckers. It tolerates a range of soil textures from silt to sandy loam, but it does not do well on heavy clay soils. Like saskatoon, it provides valuable food and nesting habitat for birds and other wildlife.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Fish and wildlife shelter and habitat value -Fair forage value -Soil stabilization - Berry producer <p>Height class: Tall (to 10 m)</p> <p>Stock type: Plugs, potted plants.</p> <p>Range restrictions: Common and widespread in most regions.</p>
<p>Wild Red Raspberry (<i>Rubus ideaus</i>)</p>   <p>Berry producer; fast growing; spreads vegetatively from suckers.</p>	<p>Wild red raspberry spreads rapidly by way of stem suckers. It is adapted to a wide variety of soil and moisture conditions, although it thrives in open clearings. It can be established quickly from stem and root cuttings providing rapid soil stabilization and competition with less desirable non-native grasses.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Poor to fair forage value -Soil stabilization -Berry producer <p>Height class: Short to medium (up to 2 m)</p> <p>Stock type: Stem and root cuttings; Plugs, potted plants.</p> <p>Range restrictions: Common and widespread in all regions</p>
<p>Silverberry (<i>Elaeagnus commutata</i>)</p>  <p>Nitrogen fixer; spreads quickly by rhizomes; tolerant of sandy soils.</p>	<p>Silverberry shows moderately aggressive rhizome growth. Its nitrogen-fixing properties are beneficial for improving soils. It is especially recommended for loose, sandy soils or steeper erodible slopes (provided moisture requirements are met). Silverberry also has the advantage of being moderately resistant to browsing and may help reduce non-native grass competition through shading.</p>	<p>Functions:</p> <ul style="list-style-type: none"> -Fair forage value -Soil stabilization -Nitrogen fixer <p>Height class: Medium (up to 4 m)</p> <p>Stock type: Can be readily propagated from root and twig cuttings or by seed (although slower process). Plugs, potted plants (not readily available; allow enough time for nursery stock propagation).</p> <p>Range restrictions: Occasional in the Boreal Natural Region, common southward.</p>



Monitoring and Post Planting Considerations:

- Take photographs of your site pre and post planting. Continue to photograph the site each summer for at least 3 to 5 years to document its progress.
- Monitor and control weeds for at least 3 years.
- Monitor planting success for at least 2 to 3 growing seasons. Replace dead or dying plants as necessary. Flagging tape, pin flags or paint can be used to mark new plantings to help you find and monitor them.
- Ensure new plantings have sufficient water for at least the first growing season. Water up to twice per week during the first growing season, if needed (e.g. during dry periods).
- Monitor wildlife and livestock use. If needed, install and maintain exclusion fences or cages to protect new plantings from damage for at least 2 to 3 years.
- Document important changes over time to assess if you have met your restoration goals. This may include features such as: improved streambank shading; reduced bank or soil erosion; improved bank stability; improved bio-filtration capacity; or improved wildlife habitat structure.
- For more information on photography monitoring techniques, refer to “Performance Monitoring” factsheet.
- Contact Cows and Fish (www.cowsandfish.org) to assist with long-term riparian health monitoring of your site.

RIPARIAN RESTORATION RESOURCES:	
The Alberta Conservation Association	Weblink: http://www.ab-conservation.com Conducts Riparian Conservation Projects with landowners across Alberta, particularly in support of sport fish habitat enhancement.
The Alberta Invasive Species Council	Weblink: https://www.abinvasives.ca/ Fact sheets on the identification, prevention and control of invasive plants in Alberta.
The Alberta Low Impact Development Partnership	Weblink: http://alidp.org/ Workshops, consultants and reference materials about erosion control techniques including soil bioengineering for streambank restoration.
The Alberta Native Plant Council	Weblink: http://www.anpc.ab.ca/ Native Plant Source List of Alberta native plant suppliers; Plant Collection Guidelines for the Horticultural Use of Native Plants
The Alberta Riparian Habitat Management Society (Cows and Fish)	Weblink: http://www.cowsandfish.org/ Riparian Health Assessment services, presentations and workbooks; riparian management resources; Growing Restoration Fact Sheet; riparian plant identification and riparian plant community information.
The Alberta Woodlot Extension Society	Weblink: http://www.awes-ab.ca/ Tree nursery information; tree planting expertise and consultation services.
The Association of Alberta Agricultural Fieldman	Weblink: http://www.aaaf.ab.ca/ Weed management expertise and resources; riparian conservation program coordinator contacts by County / Municipal District.
The Land Stewardship Center of Alberta	Weblink: http://landstewardship.org/ Watershed Stewardship Group directory; on-line stewardship Resource Center.
Watershed Planning and Advisory Councils	Weblink: http://www.waterforlife.alberta.ca/ Watershed Management Plans, watershed specific information and resources for stewardship groups.

