



A Guide to Riparian Revegetation

Riparian zones are located next to streams, rivers, lakes and wetlands, and have direct influence on aquatic and wildlife habitat. These include swampy areas, wetlands, small streams and side channels or intermittently wetted areas. Riparian areas or zones can broadly be described as the areas of the streambank, including side channel and associated banks, and they include upland areas not normally inundated during high water conditions. Leave strips are the areas of land and vegetation adjacent to watercourses that are to remain in an undisturbed state, throughout and after the development process. They protect the riparian zone and help protect private property from flooding and potential loss of land due to stream erosion and instability.

The following provisions are steps intended to protect leave strips and maintain a healthy functional riparian zone.

Minimizing Impacts on Riparian Areas

- Streambank characteristics and vegetation should be taken into account when planning development activities in and around rivers and streams.
- During development of the land, there should be no unauthorized work or disturbance into the riparian zone.
- Where encroachment into a leave strip is required, specific plans must be prepared and approved by DFO and MOELP in advance.
- Carefully select access points to the streambank through the riparian zone; minimize the size and duration of disturbance; and preserve streamside vegetation and undergrowth wherever possible.

- Limit machinery and equipment access and direct disturbance to streambank areas.

Stabilizing Impacted Riparian Areas

- Physical stabilization of eroding or eroded banks may be required to promote bank stability and regeneration of riparian vegetation.
- Design and construction of stabilization works should prevent their subsequent erosion.

- Remove disturbed, unstable debris from the riparian zone to prevent it from being swept away during high water.
- Retain stable large organic debris (LOD) which does not impede flows and fish migration, or promote bank erosion.

Revegetating Impacted Riparian Areas

- Revegetate disturbed areas immediately following completion of work in riparian zones.
- Establish ground cover through ground seeding to prevent surface erosion.
- Plant deeper rooted plants, shrubs and trees to provide long-term stability to the streambank and prevent erosion.

The following native tree and shrub species are those recommended for revegetating riparian areas next to streams, lakes and wetlands with the benefit of enhancing fish and wildlife habitat values.

Deciduous Tree Species:

Vine Maple	<i>Acer circinatum</i>
Hawthorn	<i>Crataegus douglasii</i> *
Pin Cherry	<i>Prunus pennsylvanica</i> *
Choke Cherry	<i>Prunus virginiana</i> *
Mountain Ash	<i>Sorbus aucuparia</i> *
Pacific Willow	<i>Salix lasioandra</i>
Pacific Crabapple	<i>Malus diversifolia</i> *

Coniferous Tree Species:

Douglas Fir	<i>Pseudotsuga menziesii</i>
Western Red Cedar	<i>Thuja plicata</i>
Western Hemlock	<i>Tsuga heterophylla</i>

Shrub Species:

Red Osier Dogwood	<i>Cornus sericea</i> *
Thimbleberry	<i>Rubus parviflorus</i> *
Salmonberry	<i>Rubus spectabilis</i> *
Elderberry	<i>Sambucus racemosa</i> *
Snowberry	<i>Symphoricarpos albus</i> *
Red Huckleberry	<i>Vaccinium parviflorum</i> *
Nootka Rose	<i>Rosa nutkana</i> *
Shrub Rose	<i>Rosa rugosa</i> *
Pussy Willow	<i>Salix discolor</i>

* denotes fruit-bearing species

Planting Criteria:

- All tree and shrub species should be guaranteed nursery stock for successful transplanting.
- The correct botanical name should be used to order planting stock and tags should be left attached for field identification.
- Tree stock should be a minimum of 1.5 meters in height when purchased, and planted at the width suitable for the mature stock (no greater than 2.0 meters apart).
- Stock should be planted in the fall (September to October) and spring (March to April) depending on local conditions.
- The quantity of stock planted should ensure at least 80% take, or replanting will be required.
- Additional fertilizing and watering may be required if site soil conditions are poor for successful established growth.
- Fruiting trees and shrubs should be planted to promote recolonization by seed and provide bird/wildlife food sources.

Suggested Planting Layout:

Planting layout will depend on what is required to reestablish or enhance existing riparian vegetation, species selected, density of plants, mature plant heights and planting system: linear, random, grid, etc.

Ground Seeding:

Seeding reduces surface erosion, enhances the soil's absorption and retention of water and promotes establishment of suitable soil conditions for larger plants. Generally, a combination of 2-5 species of seed-forming grasses, bunch grasses and nitrogen-fixing legumes are required, depending on soil type, climate, soil moisture and species compatibility. A general purpose seeding mix would include:

25% red fescue	20% perennial ryegrass
15% hard fescue	15% orchard grass
10% alsike clover	10% white clover
5% reedtop	

Additionally:

- Seeding should occur in spring or fall when soil conditions are suitable.
- Grass-legume ratio should be 70:30 in wet areas and 80:20 in dry areas.
- Dry seeding should be done at a minimum rate of 80 kg/ha.
- Fertilize with 19-20-12 at a minimum rate of 400 kg/ha.

Live Staking:

Live staking usually involves the planting of rooted or unrooted cuttings of *Populus* or *Salix* to establish shrubs for the prevention of erosion and protection of streambanks. The shrub species used for live staking must be:

- Indigenous to the area, easily propagated and provide the required effect.
- Harvested with the dormant plant's previous season's growth with straight, healthy stalks and clean unsplit ends.
- Cuttings 15-20 cm long with a mid-stem diameter of 2 cm minimum. Avoid using the top 10 cm of the stem. Cuttings should have a minimum of two healthy buds per stem.



Planted in late Autumn or early spring after buds have set (full dormancy) with two buds above ground, but with as little stem exposed as possible.

Cuttings planted firmly in the soil at required density and spacing.

Experience has shown better survival and shrub development if 3-4 cuttings are bundled and planted together.

Harvesting of cuttings should not depopulate or destroy native shrubs; collection of cutting should be from a large population for minimum impact.

For Further Information

Contact your local office of the Department of Fisheries and Oceans, or Ministry of Environment, Lands and Parks.