

A photograph of a man and a young girl participating in a stream restoration project. The man, on the left, is wearing a dark blue hooded rain jacket and is kneeling on the ground, carefully placing a small green seedling into a hole in the soil. The girl, on the right, is wearing a white puffer vest over a blue long-sleeved shirt, black pants, and colorful patterned rain boots. She is also kneeling and looking down at the seedling. The background shows a grassy area with some trees and a stream bed. The bottom of the image has a green curved overlay.

Community Guide to Stream Restoration

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This booklet has been created to assist community groups with undertaking projects to **restore our streams and improve our freshwater.**

Our Region is home to 17 different species of native freshwater fish and numerous freshwater invertebrates. Restoring areas by planting native trees along our streams and rivers will help to:

- Improve water quality
- Reduce stream bank erosion
- Create habitat for aquatic life and birds
- Improve the food source for aquatic life
- Reduce water temperature fluctuations.



The following steps will guide you through your stream restoration project:



Step 1:

Choose a restoration site and identify what is significant about that site



It is a good idea to schedule regular meetings with your group and create a contact list of volunteers. That way decisions can be made easily and everyone is involved with the progress of the project.

Check with Horizons Regional Council before planting drains as some areas fall into drainage schemes or flood protection areas and need to be left free of vegetation.

You may already have a project site in mind, but if not make sure to choose a site where your goals are achievable. There are many factors to consider when deciding on a project site and one of these will be; is the site on public or private land and do you need permission or buy in from the landowners, community and other stakeholders?

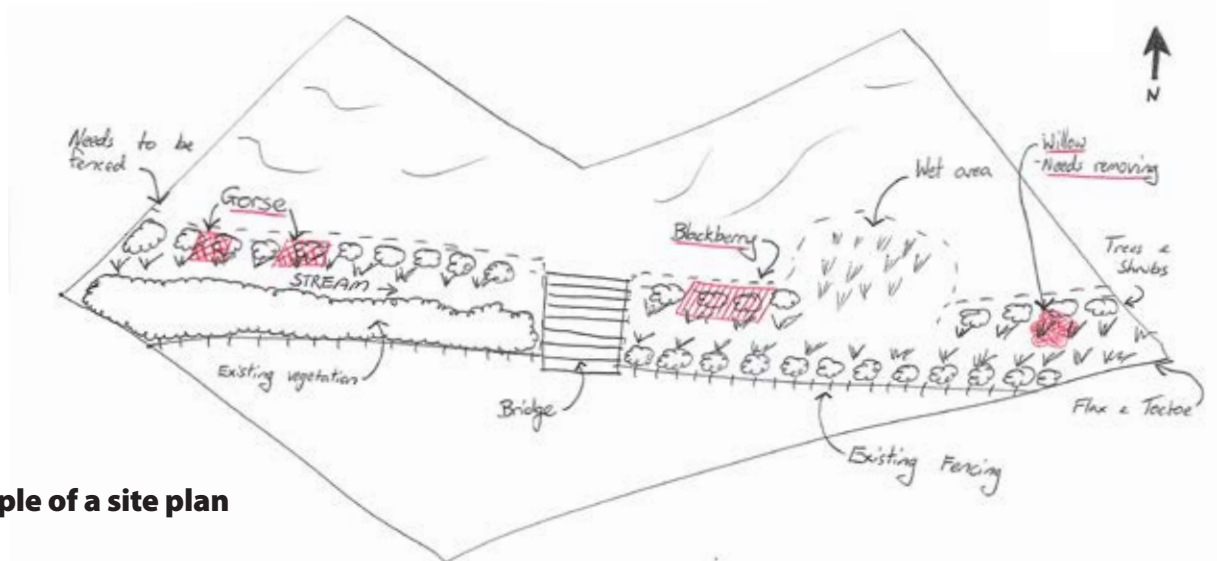
It is important that your objectives are achievable, manageable and relate to the significance of the site. You may want to plant and create habitat for native fish but you need to consider the wider catchment; for example are there any barriers to fish migration down stream or is it only a seasonally flowing waterway? The site may be culturally significant or an area which would benefit from riparian vegetation. Remember that restoration planting

will need ongoing maintenance to be successful so be careful not to bite off more than you can chew!

It is often helpful to draw up a plan of the site so that the whole group has a visual idea of how the restoration at the site will take place – don't worry it doesn't have to be your finest piece of art!

Try to include:

- Existing vegetation (both native and exotic)
- Weeds (Identify the different species as this will determine the method of control)
- Soil moisture (Identify flood prone areas, wet areas and dry areas)
- Areas for planting and areas to leave open for access
- Fence line and other structures



Example of a site plan



There is an online tool available through Dairy NZ that allows you to create a fencing, planting and maintenance plan for stream restoration. Visit www.dairynz.co.nz for more information.



Step 2: Work out your budget

It is important to work through all the costs you are likely to face to ensure that you will be able to cover them. Are volunteers going to help with planting? Will you need skilled labour for some jobs such as weed/tree removal or fencing? You may need to contact local nurseries or get fencing quotes if you are unsure

what the cost of some items will be. Below are some guidelines and approximate costs (GST exclusive) for common items. This is to be used as a rough guide only and quotes are recommended, as costs at each site will vary.

APPROXIMATE COSTS TO GUIDE YOUR BUDGET

ITEM	ESTIMATE OF PRICE (EXCL. GST)
PLANTING COSTS	
Native plants (PB3 size)	\$3.80 per plant
Spot-spray before planting	\$0.30 per plant
Planting labour	\$1.50 per plant
Bamboo stakes	\$0.20 each
Fluorescent spot marker	\$7.00 per can
Small plant protector (e.g. rabbit or spray protector)	\$2.00 per protector
Release spray after planting	\$0.50 per plant
FENCING CONTRACTOR RATES (INCLUDING MATERIALS AND LABOUR)	
2 Wire electric	\$3.50 - \$4.50/m
3 Wire electric	\$4.50 - \$6.00/m
5 Wire (2 electric)	\$8.50 - \$9/m
8 – 9 Wire conventional (3-5 battens)	\$15 - \$18/m

NOTE: Prices are estimates only based on 2016 material costs and are to be used as a ROUGH GUIDE ONLY. Prices are likely to change and will vary for each restoration site. If using a contractor, a quote from the contractor is recommended when planning your budget.



Step 3:

Decide on appropriate plants

It can be overwhelming trying to decide which species to plant in your restoration site. Keep in mind the goals of the project and the climatic conditions at the site when choosing plants.

Our region has been divided into seven ecological areas and different plants are suitable for each area. These planting guides can be found on the Horizons website www.horizons.govt.nz. You can also ask a Horizons Freshwater Management Officer for free advice on plant selection, just call the freephone 0508 800 800.

Ask yourself:

- Do the plants need to tolerate high winds, salt spray or frosts?
- Is the soil constantly wet or likely to get very dry?
- Are there existing projects within the catchment that may already have eco-sourced plants available?
- Is the area prone to flooding?



Remember to order your plants AT LEAST 2-3 months before planting to ensure you do not miss out and if you want specialist eco-sourced plants you may need to order them 1-2 YEARS in advance.

General principles when choosing plants

SIZE OF PLANTS	BENEFITS	DRAWBACKS
PB3 Bags or 1.5L pots	<ul style="list-style-type: none"> • Large enough to get a head start on weeds/grass • Reasonable purchase price • Doesn't need to be planted immediately 	<ul style="list-style-type: none"> • More expensive than smaller plants or open grown plants
Root trainer and smaller pots	<ul style="list-style-type: none"> • May suit a windy site better • Cheaper 	<ul style="list-style-type: none"> • Survival rate is usually lower • Need more care after they have been planted to ensure they are not smothered by weeds/grass
Open grown plants (Grown in the ground rather than pots and lifted much like a pine tree)	<ul style="list-style-type: none"> • Good root growth • Cheaper than potted plants 	<ul style="list-style-type: none"> • Limited range of plants available via this method • Need to be planted immediately to ensure good survival rates • Require more care during planting as root mass is larger • More sensitive to soil conditions (particularly moisture conditions) at the time of planting

Choose local native plants

Not all native plants are naturally found in our Region. Choose plants which are endemic to the area and are not invasive. Even though a plant is native it can become weed-like and take over your site. Appropriate plants for your area can be found from the Horizons Regional Council website www.horizons.govt.nz.

Eco-sourcing

Eco-sourcing means collecting seed or cuttings from a remnant bush or wetland within the general area of your restoration site and using the seedlings

propagated from these locally sourced remnants at your site. Eco-sourcing will ensure the plants will be well suited to the climatic conditions and more likely to establish and thrive.

It can be difficult to find a remnant bush close to the project site so you may need to look further afield for seed collection. Check with local nurseries as they may already have a collection site nearby which will be suitable to supply plants for your project.

Remember that growing plants takes time so seed and cutting collection for propagation needs to occur at least one year prior to planting, sometimes longer depending on the species.



Plants sourced from outside our region or even just outside of the site can bring in 'unwanted genetics' and can reduce the uniqueness of our local biodiversity. Try to choose native plants grown locally.

What to plant where

For successful plant growth it is important to put the right plants in the right place. If an area is wet and boggy or close to the water's edge and could get flooded, then it is best to choose plants which can handle "wet feet" (flax, sedges, toetoe). Any trees or shrubs should be placed further back from the stream

where the ground is less saturated. It is a good idea to leave at least a one metre strip of grass between any plants and the fence to ensure that plants do not grow into fence wires and stock do not reach the plants. Plants are usually spaced between 1.5 - 2m apart depending on the species.

How to plant a typical stream margin

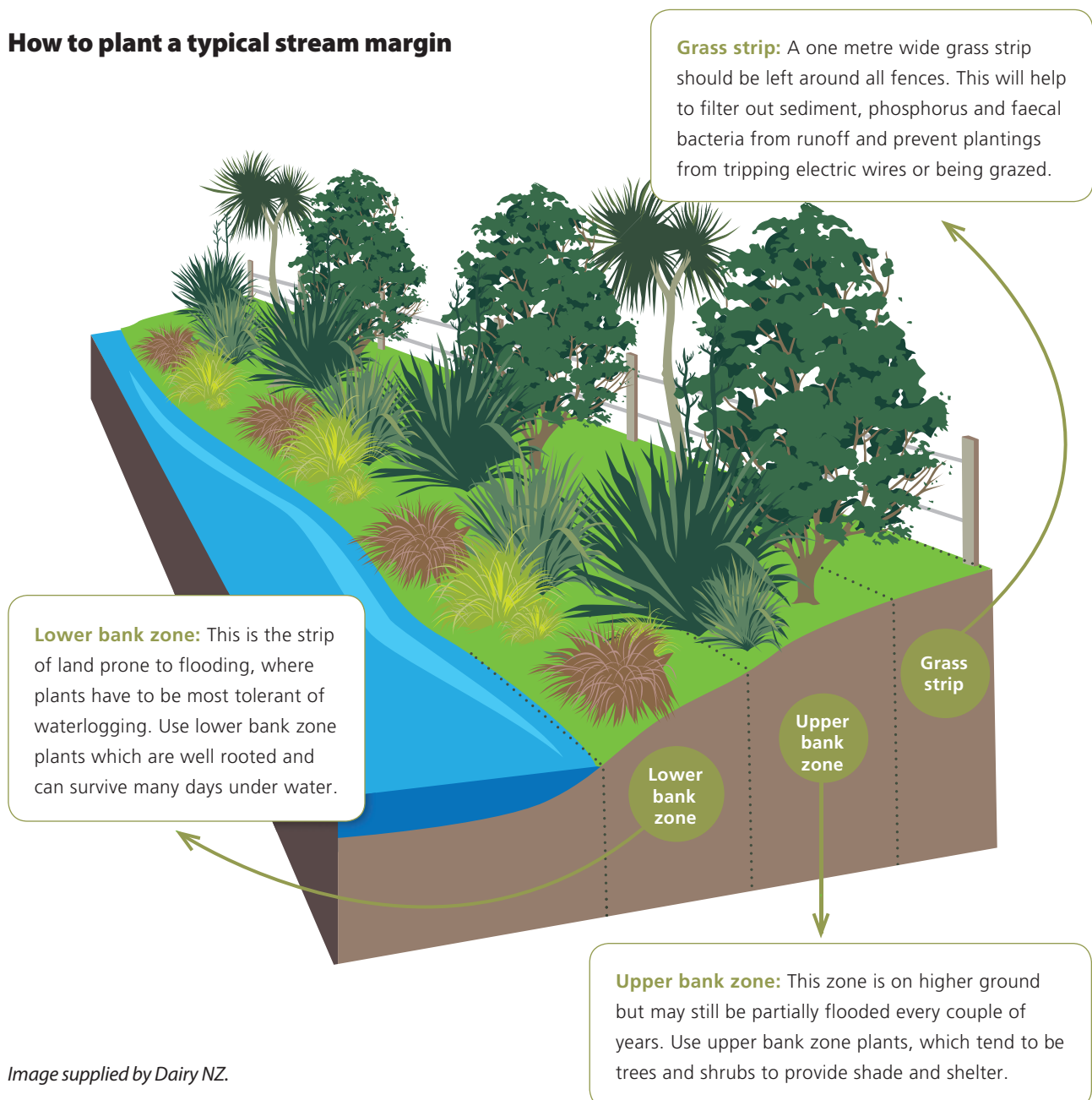


Image supplied by Dairy NZ.



When to plant

May to August is the best time of year to plant. Cooler temperatures and consistent moisture allow plants to get established well before the summer months and before the ground dries out. If you are planting frost tender trees, then it is best to leave these until after the heaviest frosts have passed. We recommend planting coastal areas earlier (May/June) to maximise growth before summer; whereas in cooler areas such as the Central Plateau or around Taihape, plant later after the worst of the frosts are over (August/early September).

Where to get your plants

You have decided what plants you would like and how many you will need, but where do you get them from? There are many local nurseries in the Horizons Region that have locally sourced plants. It is best to source plants from a local nursery that has sourced seed locally and has grown plants in similar climate conditions to your restoration site. Horizons Regional Council can help you order your plants, just contact a Freshwater Management Officer at the Council on 0508 800 800.



Step 4: Preparing your site

Preparation is everything when it comes to successful restoration planting. Weeds can be the ultimate downfall to any planting project and are much harder to manage once planting has occurred. Some weeds will need more than one treatment and some weeds will need to be controlled well in advance of planting; up to 12 months or more.

Prepare a weed management plan

Different weeds are controlled by varying methods, these include being:

- Grubbed and pulled out by hand
- Cut down and stumps painted with herbicide
- Spraying the whole plant with herbicide

You also need to consider the type of herbicide to use as different weeds will be controlled by different chemicals. The timing of application is also important;

most weeds are best controlled in the active growing period in spring and summer, however some are best left to late summer and autumn.

Some examples of invasive weed species include; convolvulus, blackberry, gorse and old mans beard.



Check out the Weedbusters website for information and control methods (www.weedbusters.org.nz).

Fence off waterway from animals

It is critical to prevent stock from grazing and trampling your site. Where fencing is needed, it is best to ensure the fence is up before you start planting. It is never a nice feeling to see all your newly planted trees eaten by stock that have broken through a temporary fence.



Recently fenced area

Control animal pests

Some animal pests can give your new plants a really hard time. Pest animals such as rabbits, hares, goats and deer will eat young native plants. If animal pests are a problem in the area, consider controlling the pests before planting or using plant protectors and repellent sprays. For more information regarding animal pests visit the Horizons website www.horizons.govt.nz.

Spot-spray before planting

For the greatest success, it is best to spray 60-70cm diameter spots approximately two metres apart with glyphosate (Roundup® or equivalent), four to six weeks before planting. This will allow the grass to die and reduce the competition between the grass and your

plant. This also makes it easier at planting time as digging is easier and everyone can see where plants are needed.



Do not use a herbicide with residual activity that remains in the soil for prolonged periods of time. Also do not spray out the whole area, just spots.

Take photographs

To help you monitor your progress it can be very helpful to have a photo point. This involves taking a photo from exactly the same spot every year to see your progress. Often a post, corner of a fence line or a gate is used as a photo point.



Example of spot spraying



Step 5: Planting day



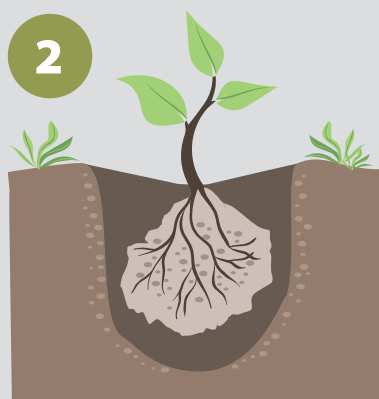
Your site is ready for planting! Now it's just the final touches to get the plants in the ground. Remember May to August is the best time of year to plant. Things to consider for the day include:

- Is the planting going to be done by volunteers? If you are using a contractor to plant, make sure they are booked in.
- Is there a particular community, iwi, school or group of people you wish to involve in the planting day?
- Do you need to advertise the planting day to ensure there will be enough volunteer help?
- Where are the plants going to be delivered? Do you need vehicles or trailers to move the plants to the planting site?
- Will the plants need to be placed in the correct areas the day before planting so the right plants end up in the right place?
- Where will volunteers' park their cars and is there easy access to the site?
- What Health and Safety considerations will you need for the day?
- If there is bad weather on the planting day will you postpone the event?
- Will you need to supply food/ barbecue for the volunteers?
- Do you need to use weed mat, mulch or plant protectors around your plants?



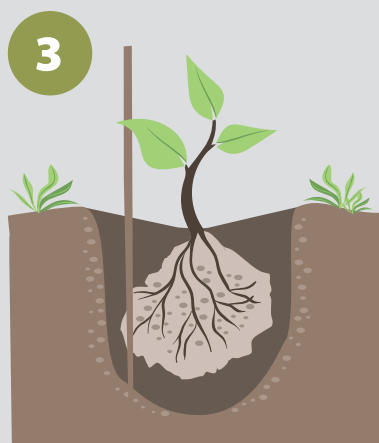
Place the plant in a hole which is wide enough to accommodate the plant roots without them being bent or curled up and loosen soil below and to the sides of where the plant will be to ensure roots can spread into the soil easily.

The hole should be deep enough so the stem is 1-2cm below the soil surface.



Fill the hole with soil and press in soil firmly with your heel. It is a good idea to leave a dip in the soil around the stem of the tree to encourage water to flow to the plant when it rains.

This will help the plant through dry summer months.



If you place a stake next to each plant it will help you find them when you are weeding (do not attach the plant to the stake).

Using stakes is a useful way to tell if any plants have died and need replacing.

It is amazing how difficult it can be to relocate plants once the surrounding weeds have started to grow in spring and summer.

Image supplied by Dairy NZ.



Step 6: Looking after your investment

After planting it's not all sit back, relax and watch you plants grow. Weeds and pest animals are going to invade your new restoration area, especially while the plants are small. Weed control "releasing" involves removing any unwanted grass or other plants from around your new plants. This may need to be done once or twice in the first year. The first release should be done in spring.

Releasing can be done by pulling the grass and other weeds away from your plants by hand or the careful use of glyphosate spray using a spray shield. Gallant® is another herbicide that can be used to control grass but will not control broadleaf weeds.

(NOTE: Gallant® will kill toetoe so do not use this spray around them). Other weeds may also need to be controlled to ensure that they do not take over your new plants.

To know how successful your restoration project has been, consider monitoring your progress. This could be as simple as keeping track of how many trees have survived and taking photos as the plants grow.



Native plants are very sensitive to herbicides. Be very careful when spraying and consider using a spray shield.

Your Restoration Plan:

THE GOALS OF OUR RESTORATION PROJECT ARE:

e.g. Restoring native vegetation to improve fish and native bird habitat.

1.

2.

3.

4.

HOW FREQUENTLY AND WHERE WILL MEETINGS BE HELD:

e.g. First Tuesday of each month, 7pm at the community hall

SITE DETAILS:*e.g. Joe Blogg's property, 154 Main Road, (06) 654 4534***Map of area:****Map Reference: E-****/N-****SITE DETAILS CONTINUED:
QUESTIONS TO ASK THE GROUP****HOW WE WILL TAKE THESE INTO
ACCOUNT?****WHO WILL
FOLLOW UP
EACH ACTION?**

Are there potential problem such as weeds, flooding, pest animals or vandalism?

e.g. we will create a weed management plan to address weed issues

Are there any reasons the area does not currently have plants (is the area part of a drainage scheme or has it been left as grass for Inanga spawning?)?

Will the area need fencing from livestock before you can plant?

If volunteers are going to help you plant, is there easy access to the area and plenty of safe parking for vehicles?

Are there any other features of the site such as a man-made weir or culvert on the stream which restricts fish migration upstream?

What considerations do we need to make regarding health and safety and do we need any personal protective equipment?

ESTIMATED BUDGET FOR OUR PROJECT

[illegible]

WHAT PLANTS WILL WE NEED FOR THE SITE

[illegible]

WHERE WILL WE GET OUR PLANTS FROM

NURSERY NAME	PHONE NUMBER	WHEN WILL WE ORDER THEM	WHO WILL ORDER THEM

WEED MANAGEMENT PLAN				
WEED TYPE	SIZE OF WEED AREA	CONTROL METHOD	TIME OF YEAR TO CONTROL	WHO WILL UNDERTAKE THE CONTROL
<i>e.g. Blackberry</i>	<i>medium</i>	<i>Escort®</i>	<i>Summer – Autumn</i>	<i>Contractor (J. Blogg)</i>

CONTACT DETAILS FOR THOSE INVOLVED WITH THE PROJECT			
NAME	PHONE NUMBER	EMAIL ADDRESS	ROLE (IF DEFINED)



For further information about riparian planting contact:

Horizons Regional Council, Freshwater Management Team

0508 800 800 | www.horizons.govt.nz