



# **W.E.T. Restoration Activities**

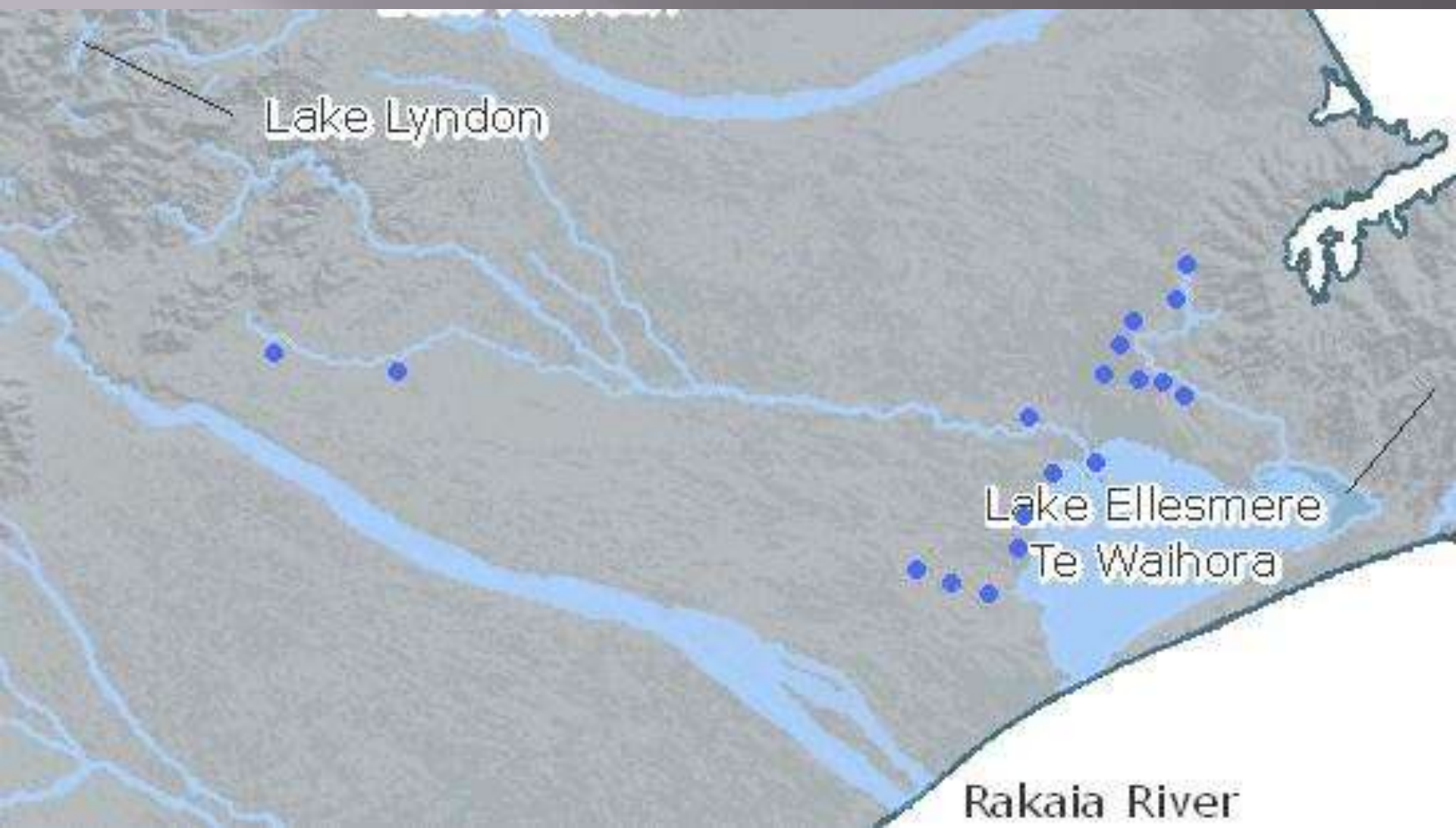
**Since the first  
Living Lake Symposium  
In November 2007**

**Stephen Brailsford - Restoration Consultant to WET**











**Selwyn River  
Chamberlains Ford at plantout**



**Selwyn River  
Chamberlains Ford after 1 yr**



**Silverstream site preparation**





**Silverstream during plantout**



**Silverstream after 1 yr**



## Riparian Restoration – lessons learned

Planting the riparian margins of waterways can improve stream health and water quality, enhance biodiversity, increase property values, and reduce the need for waterway maintenance. Over two planting seasons Waihora Ellesmere Trust (WET) has been directly involved in the installation of over 50,000 native plants on a range of riparian sites. We are keen to share what we have learned and to encourage and support landowners who would like to undertake planting of natives along waterways.

Outlined here is a way to approach riparian planting which we have found to be a cost effective means to ensure high plant survival and growth – well over 90% survival has been achieved by WET where this method has been used.

### Key steps:

- Planning
- Consents and approvals
- Site preparation
- Species choice & plant selection
- Planting
- Maintenance



### Planning

Before you start, be clear about your objectives and decide what approach and system you will use, who will be involved, and exactly what resources will be required. Successful restoration involves more than just putting plants in the ground.

### Consents and Approvals

In Selwyn District most waterways have a land drainage function and this means that there are restrictions on what can be planted alongside waterways. The use of chemicals near water may also mean that a resource consent is needed. Before you start, check with both district and regional authorities about the need for consents and approvals.

### Site Preparation

WET has found that success is best achieved when all competing vegetation is removed prior to planting where possible, particularly in drier areas (but not on steep banks where existing vegetation cover provides some stabilisation). It will also be necessary to erect fencing to exclude stock from the area to be planted.

### Species Choice & Plant Selection

Soils and climate need to be carefully evaluated across the whole site and the appropriate species chosen - those which can tolerate the extremes they will encounter. There may be considerable variation within one site. There are publications available which can give you guidance, or you can consult someone with experience in plant choice. Basing the species choice on the communities that would naturally occur will increase the chance of success. Eco-sourcing of plants wherever possible will give the best outcome for biodiversity – see the Selwyn District Council website for details. You may need to place orders for seedlings well before you intend to plant.

Restoration seedlings can be grown in pots of volume 250cm<sup>2</sup> to 400cm<sup>2</sup> (T7 through to RX90). Seedlings should have stem diameter at ground level of at least 5mm when planted out. Care should be taken to source well grown restoration grade seedlings and make sure they are hardened off before planting out.



### Planting

Most plants do well at a spacing of 1.5m x 1.5m. This equates to an average of 4500 plants per hectare. Different species have different growth habits and a plant mix which mimics that which would occur naturally will lead to a sustainable plant community. WET typically uses a mix of 15% large trees, 45% small trees/large shrubs, and 40% understorey shrubs/grasses.

Getting the plants in the ground involves considerable effort. The sites WET has been involved with have been planted in a variety of ways - community/volunteer planting days, commercial contractors, or prison labour crews. In all cases, labour needs to be well organised, equipped and supervised to be effective.



Seedlings are best planted between autumn and spring while they are dormant. Main considerations are moisture and frost - if the site is prone to heavy winter frosts it is best left until spring. Lower altitude, coastal sites can generally be established in autumn.



In riparian margins, the effects of floods should also be considered. Newly planted seedlings are more susceptible to the effects of waterlogging than established plants, so it may be preferable to wait until peak winter floods have passed.

When planting out, the hole should be well cultivated and the seedlings well firmed in. Including a 21g slow release fertiliser tablet in the bottom of the planting hole will help supply a balanced volume of nutrients to the young plant. This improves vigour and reduces the time needed until plants become well established.

#### Protecting the plants

Installing a 'combiguard' for each seedling provides a wide range of benefits. This involves a wool mat around the plant's base and a 300mm high plastic sleeve, supported by bamboo sticks. This provides each plant with some protection from wild animals, wind, frost and herbicides. A microclimate is also established which encourages growth.



#### Maintenance

Removing competing weeds will allow seedlings to get adequate water and light. WET generally achieves this using herbicides (after ensuring that we hold the appropriate consents). In wetter areas spot spraying around each seedling works well; in drier areas spraying for total weed control between seedlings gives the best results. The plastic sleeves will protect the seedlings from spray, although choice of herbicide is critical. Sleeves can be removed once the plant is well established - 1 to 4 years, depending on species and site conditions.



#### What does it all cost?

As noted above, WET used a range of different types of labour. This, plus variations in plant costs and logistics of establishing each site, gives a range of costs. If you expect to pay commercial rates for labour, your costs are likely to be towards the top end of the range.

In addition to establishment costs, maintenance must be undertaken - exact maintenance costs will depend on the site characteristics and the weather in the first few years but it is likely to be around \$1.50 - \$2.50 per seedling per year, for at least two years.

| WET's Planting Costs (excluding maintenance)                     | WET's range Costs per plant | WET's average |
|--|-----------------------------|---------------|
| Planning & set up  | \$0.50 - \$1.00             | \$0.72        |
| Site preparation (not including fencing)                         | \$0.50 - \$0.80             | \$0.68        |
| Seedling purchase  | \$1.20 - \$2.45             | \$1.53        |
| Planting labour (based on 69 - 130 seedlings per person per day) | \$1.12 - \$1.41             | \$1.10        |
| Resources (fert tabs, combiguard)                                | \$0.27 - \$1.41             | \$1.11        |
| Logistics, supervision & co-ordination                           | \$0.76 - \$1.96             | \$1.40        |
| <b>Totals</b>  | <b>\$5.45 - \$8.50</b>      | <b>\$6.54</b> |



waihora ellesmere trust

March 2011

website: [www.wet.org.nz](http://www.wet.org.nz)

To find out more about WET's planting programmes and techniques, or to get involved in our activities, please contact:

Waihora Ellesmere Trust  
PO Box 198, Tai Tapu 7645,  
Ph: 021 052 9720  
Email: [manager@wet.org.nz](mailto:manager@wet.org.nz)





**Mitchells Road  
Mudfish Restoration Project**



**Mitchells Road release spraying**



**Mitchells Road after 2 mths**



**Mitchells Road after 1 yr**





**Tramway Reserve/Skilling**



**Tramway Reserve/Skilling**



**Tramway Reserve/Skilling after 1 yr**



**Tramway Reserve after 5 yrs**

# True Cost of Mortality

| Operator     | Costs per seedling | Total Cost | Survival after 1yr | Survival % | Cost per live plant    |
|--------------|--------------------|------------|--------------------|------------|------------------------|
| Contractor A | 1000 @ \$6.00 each | \$6,000    | 160                | 16%        | \$37.50 per live plant |
| Contractor B | 1000 @ \$6.50 each | \$6,500    | 680                | 68%        | \$9.55 per live plant  |
| Contractor C | 1000 @ \$7.50 each | \$7,500    | 950                | 95%        | \$7.89 per live plant  |



**Boggy Creek / Inwood at plantout**



**Boggy Creek / Inwood flood flow following plantout**



**Boggy Creek / Inwood after 6 months**





**Boggy Creek / Inwood after 1yr**



**Halswell River OTTR Streamcare Group**  
**Willow poisoning**



**Willow removal**



**Rebatter banks**



**The Plantout**



**600m of stream bank planted out**



**Flood flows**



**Flood flows**



**DANGER**  
**RAW SEWERAGE**  
**WATER POLLUTED**



Earthquake



**Dredging the river**



**Winter snow**



**1 yr after planting**



**1 yr after planting**



**Carex secta on the edge**



**Working bill board**



**Today**





**Inappropriate species**



**Wind throw – bank damage**









# **Sustainable Drain Management in Selwyn/Waihora**

*healthy waterways within productive land*

