

Waiwhakareke Restiad Peat Bog Re-creation Guidelines

Bev Clarkson

Landcare Research
Private Bag 3127,
Hamilton
April 2008

1 Background

Restiad peat bogs dominated by *Sporadanthus ferrugineus* (cane rush) and *Empodisma minus* (wire rush) are unique to New Zealand. They are very different from the more typical Sphagnum moss bogs that are widespread in the Northern Hemisphere and elsewhere in the world. The *Sporadanthus-Empodisma* bog type was once common throughout the northern North Island from near Kaitaia to Te Awamutu but, because of widespread drainage, is now restricted to three sites in the Waikato region; Kopuatai, Torehape, and Moanatuatua. Around Hamilton City, *Sporadanthus* once dominated former bogs at Rukuhia 'Swamp' to the south and Komakorau/ Gordonton Bog to the north. At Waiwhakareke, the *Sporadanthus* bog types probably also occurred on the flat peat land immediately north of the lake.

Several threatened species occur within this bog type. These include *Sporadanthus ferrugineus*, which is host to the recently-discovered 'world's thinnest caterpillar - Fred the Thread' (*Houdinia flexissima*), black mudfish, North Island fernbird, and several herbs and ground orchids. Other species of interest include carnivorous plants, e.g., sundews and bladderworts, and wire rush with its upward-growing peat-forming cluster roots.

Two experimental *Sporadanthus* bog re-creations were set up in spring 2006 at Lakes Komakorau and Serpentine, north and south of Hamilton city respectively (project leader: Monica Peters, Landcare Trust). These plantings are now relatively well established and together with initial restoration trials at Torehape Mine, have guided the best-practice approach for the Waiwhakareke re-creation project.

2 Site features

The visitor will see a raised peat bog about 15m wide by 25 m long and dominated by dense swards of the >2m tall *Sporadanthus* plants. The walking rack will be nearby and a raised viewing platform (additional to, or in place of the Observation Hide in the Concept Plan) will allow people to view over the brown waving flower heads. Appropriate interpretative signage will explain the ecological significance of the restiad bogs, and also focus on other threatened and interesting species e.g., Fred the Thread, mudfish, NI fernbird. Additionally, information on the Landcare Trust *Sporadanthus* restoration experiments at Lakes Komakorau and Serpentine could also be included.

3 Site Preparation

The preferable site for the bog restoration is close to the lake edge on the northeastern side at GPS coordinates E2706426 N6378988. Here, the peat is at least 1.5 m deep (peat corer hit wood at this depth) so soil conditions should be suitable for bog establishment. The size of the bog will depend on the manpower available but generally, bigger is better. I suggest about 15 m width (away from the lake) by 25 m length

(parallel to lake) to provide a reasonably compact shape. The proximity to the lake is important so the bog doesn't dry out too much and to provide connectivity between the lake-bog habitat e.g., for mudfish.

The site will need to be scalped of existing vegetation (exotic pasture grasses and weeds) and upper (fertile) soil layers excavated to a depth of 10-20 cm to form a shallow depression to be filled with peat to a depth of c.30 cm. The peat can be sourced from Gamman Mines, Torehape, on Central Road, Hauraki Plains (contact Russell Gamman, ph 0274949204). The peat bed will need to be prepared in relatively dry weather, eg May 2008, and then the plants can be planted soon afterwards. The amount of peat needed is 25 m X 15 m area x c.0.3 m deep = 112.5 m³ (c.120 m³).

4 Hydrology

A water supply (eg small tank, underground PVC pipes) will be needed in the first 1-2 years to assist with plant establishment. This is particularly important given the recent hot dry summers experienced in Hamilton. Once the plants have attained nearly 100% coverage they will be less vulnerable to localized droughts.

5 Species

Key species in the initial setup (May 2008) are *Sporadanthus ferrugineus*, and *Empodisma minus*. These are sourced from the mine site at Torehape (contact Russell Gamman). Young plants (c. 2 year-old plants, up to 1 m tall) are easily accessible along or near access roads on the mine site. *Empodisma* is usually harder to find – so take most of what is available – usually in the ratio of about 5-10 *Sporadanthus* to 1 *Empodisma*. The plants can be dug out with a spade with a sod of peat protecting the roots (total root mass diameter around 20 cm), then loaded carefully (this can be several plants deep) onto a flat-decked ute or similar. 4WD is advisable on the mine site especially if there has been recent rain. The plants can then be transported back to Hamilton for direct transplanting within the next few days. They will need to be thoroughly watered while waiting to be planted out. For planting, plant the *Empodisma* and *Sporadanthus* in rows to enable weeding access in the initial years, and space the two species out evenly over the peat, about 5-6 plants per m².

Contact Monica Peters monica.peters@landcare.org.nz for assistance with plant collection from the mine site. Monica led the *Sporadanthus* restoration projects at Lakes Serpentine and Komakorau and has invaluable hands-on experience. It would be worthwhile to visit at least one of these sites with Monica before the HCC project goes ahead.

In a year or two, after *Sporadanthus* and *Empodisma* are established, supplementary planting of other species can occur, eg., *Epacris pauciflora*, *Gleichenia dicarpa*, *Drosera binata*, *D. spathulata*, *Utricularia* spp., *Goebelobryum unguiculatum*, mosses and liverworts. Some other associated species will already be present at Waiwhakareke, e.g., manuka, *Baumea* spp, and will probably establish naturally but it is advisable to weed out any manuka in the first 2-3 years at least (probably ongoing weeding will be needed as manuka can overtop the bog species). Fauna will include Fred the Thread and nursery web spider (and maybe mudfish in the peat lake).

6 On-site interpretation

Free standing signage both on the ground adjacent to the bog 'ecosystem' and up on the viewing tower overlooking the plants.

7 Maintenance

Regular weed control will be necessary especially for willow, as well as any general maintenance

8 Monitoring

On-going monitoring of the bog plantings will be undertaken as part of the overall monitoring of Waiwhakareke (contact Toni Cornes UOW, tcornes@waikato.ac.nz). This will include establishment of permanent plots (size and location yet to be determined) and permanent monitoring photo points, e.g., wooden poles with flat-tops or angled (depending on the view) to sit the camera on, and an arrow indicating the direction of the photo. Also, take lots of photos of the set-up e.g., before/ after, machinery involved, planting in progress, etc.

9 Costs

Note: These costs are only estimates and some or most may not apply because of in-house HCC equipment and labour.

COMPONENT REQUIREMENTS	QUANTITY	COST PER UNIT	TOTAL
Site aspects			
Site clearance (weed removal and soil scalping)	10 hours	\$25.00/h	\$250
	Equipment hire	\$200.00	\$200
Site excavation	1.5 hours	\$250.00 (delivery)	\$250
		\$120.00/h	\$180
Peat	120 m ³ (375m ² area X 0.3 deep = 112.5m ³)	Delivery \$250	\$250
		\$30/m ³	\$3600
Hydrology			
Watering system	60m 15mm irrigation hose	\$90.00	\$90
	risers, sprayers and hose fittings	\$140.00	\$140
	Water tank, pump & fittings		\$1000
Species			
<i>Sporadanthus ferrugineus</i> <i>Empodisma minus</i>	Area = 375 m ² ; 5 plants/m ² approximately 1875 plants	Labour and transport costs –in house?	
After 2-3 years: <i>Epacris pauciflora</i> <i>Drosera binata</i> <i>Drosera spathulata</i> <i>Utricularia</i> spp. <i>Gleichenia dicarpa</i> <i>Goebelobryum unguiculatum</i> other mosses and liverworts			
Features			
n/a			
On site interpretation			
Freestanding horizontal interpretation panel	1 panel		\$2000
Viewing platform – part of overall plan –observation hide??			
Maintenance			
Likely to require follow-up weeding and maintenance (2-3 years)	40 hours	In-house?	
Miscellaneous			
n/a			
TOTAL			\$7960

Collecting the plants from Torehape mine site



Andrew Hayes planting out Sporadanthus plants at Lake Komakorau

