

Owners: Miraka Farms Ltd

Property Address: 162 Boyle Road, Winton

Regional Council: Environment Southland

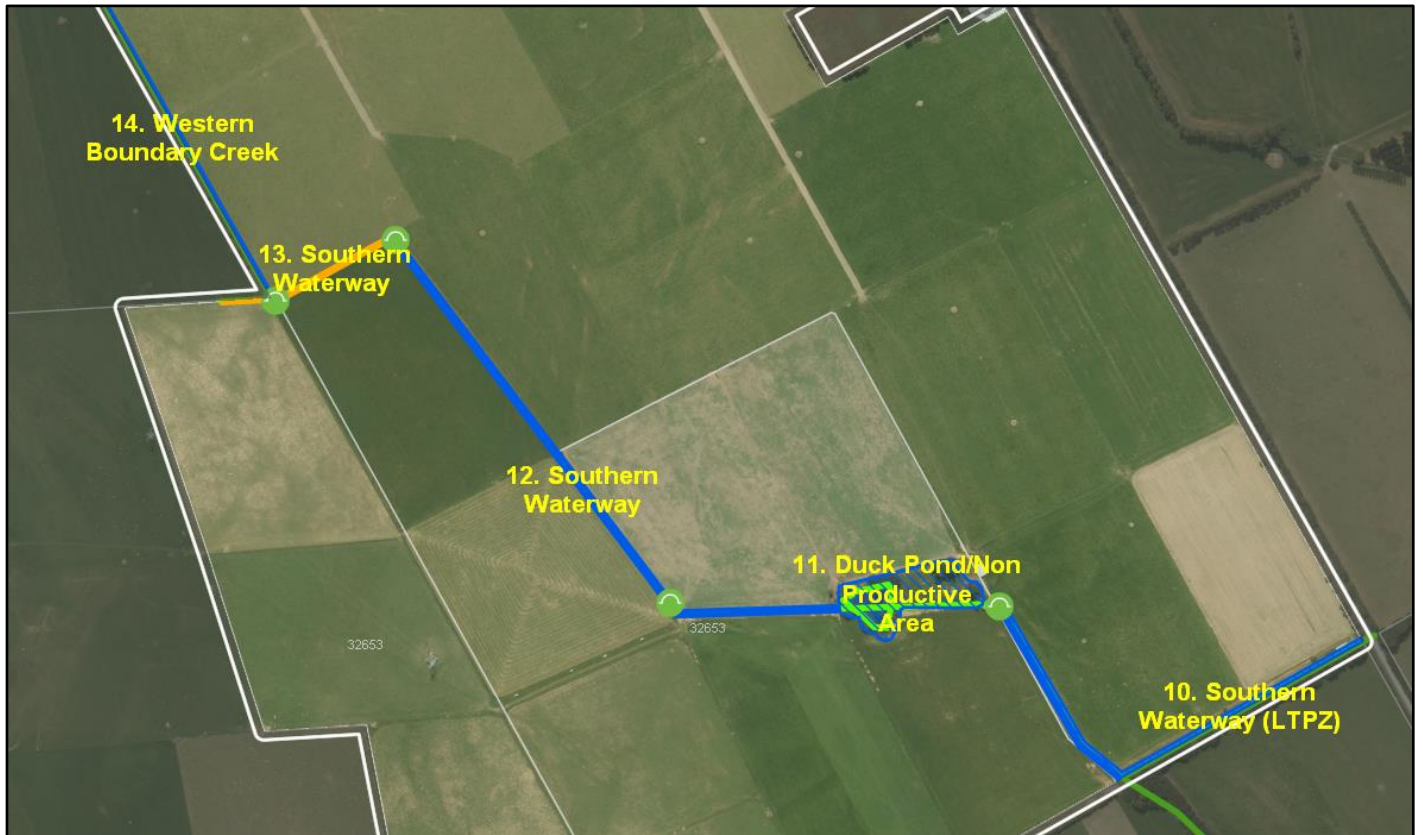
Total Farm Area: 255.39ha

Plan developed by: Cain Duncan

Date of Plan: 13th June 2017



Map 1 – Terrace Creek (Northern Section of Farm)



Map 2 – Southern Section of Farm

Prioritised Riparian Management Units (RMU) for 32653

1. Northern Tributary (PZ)



Description: Northern Tributary Planting Zone (PZ) into Terrace Creek. The stream has a stony bottom making it suitable for fish spawning. Fish were noticed in the stream during the farm visit. The east side of the stream has a 2m grass buffer, which could be planted in one row of *Carex Secta* to further enhance the fish habitat in this area (overhang into water provides habitat and shading). The western side of the stream is 1m wide and maintained as rank grass.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.11ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 50% (529 m²): 1.5m plant spacings - approximately 352 plants
- Upper Zone 0% (0m²)
- Grass Buffer Strip 50% (529 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 0% Planting Progress
- Planting 100% - September, 2020



Photo 1 – Northern Tributary – North from Lane Crossing.

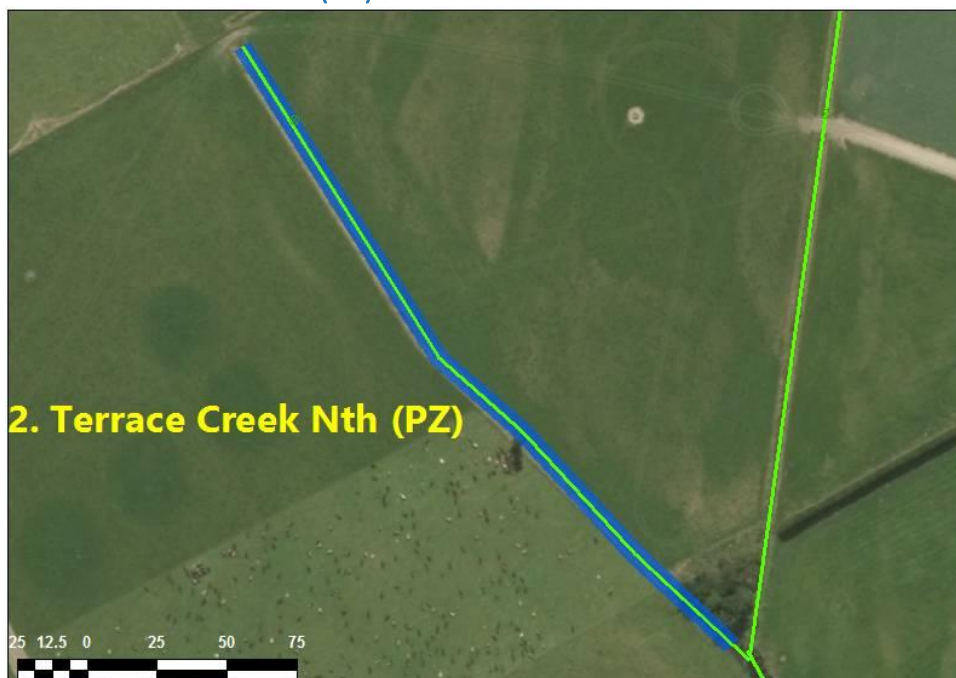


Photo 2 – Northern Tributary – South from Lane Crossing.

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

2. Terrace Creek Nth (PZ)



Description: Northern Section of Terrace Creek – Planting Zone. Similar to Section 1 in terms of size. Fish are also present in this stream although the bed has more sediment deposition. Riparian margins of 2-3m on both sides of the creek that could be planted out with one row of carex secta or red tussock to improve stream shading and fish habitat. Currently maintained in rank grass, which acts as a good filter for paddock run-off and does provide some limited fish habitat and shading.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.17ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 50% (837 m2): 1.5m plant spacings - approximately 558 plants
- Upper Zone 0% (0m2)
- Grass Buffer Strip 50% (837 m2)

Proposed completion dates:

- Fencing the RMU - Done.
- 0% Planting Progress
- Planting 100% - September, 2020

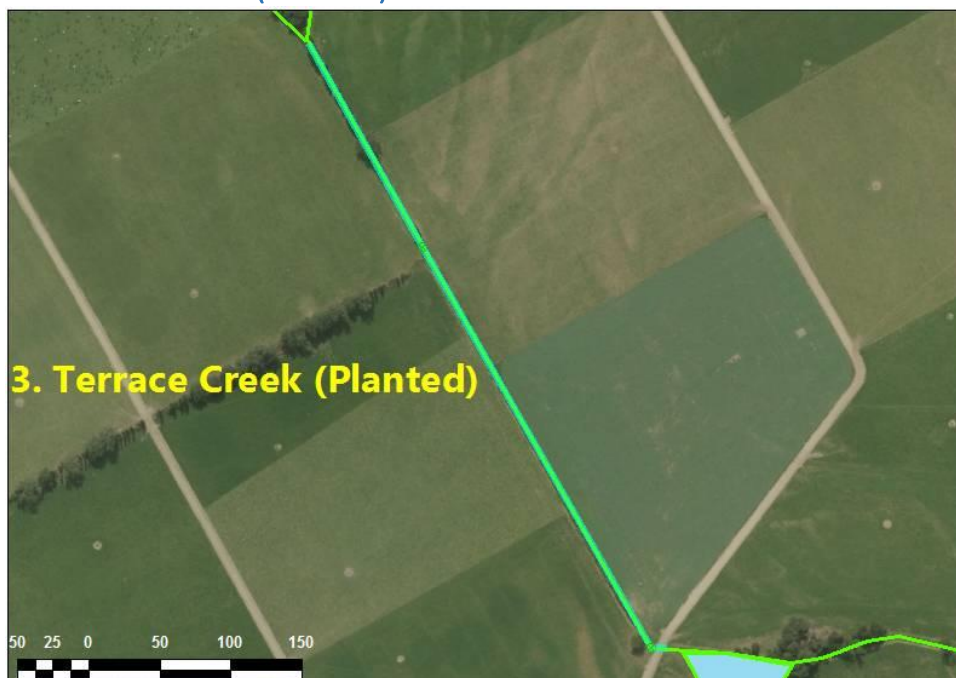


Photo 2 – Terrace Creek Nth – South from Farm Boundary

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

3. Terrace Creek (Planted)



Description: Terrace Creek above duck pond. This section of creek has clear water and good shading. Shading is provided by flax and poplar trees that have been planted along the eastern side of the waterway. The western side of the creek has a 1-2m rank grass margin that aids in filtering any runoff from the adjacent paddocks. No additional planting is planned in this section.

Fencing Status: Permanently Fenced

Vegetation Status: Planted

Flood Risk: Low

Proposed Area: 0.2ha (refer to appendix 1 for zone descriptions and plant options)

Proposed completion dates:

- Fencing the RMU - Done
- 100% Planting Progress



Photo 3 – Terrace Creek – Flax and Poplar Trees.

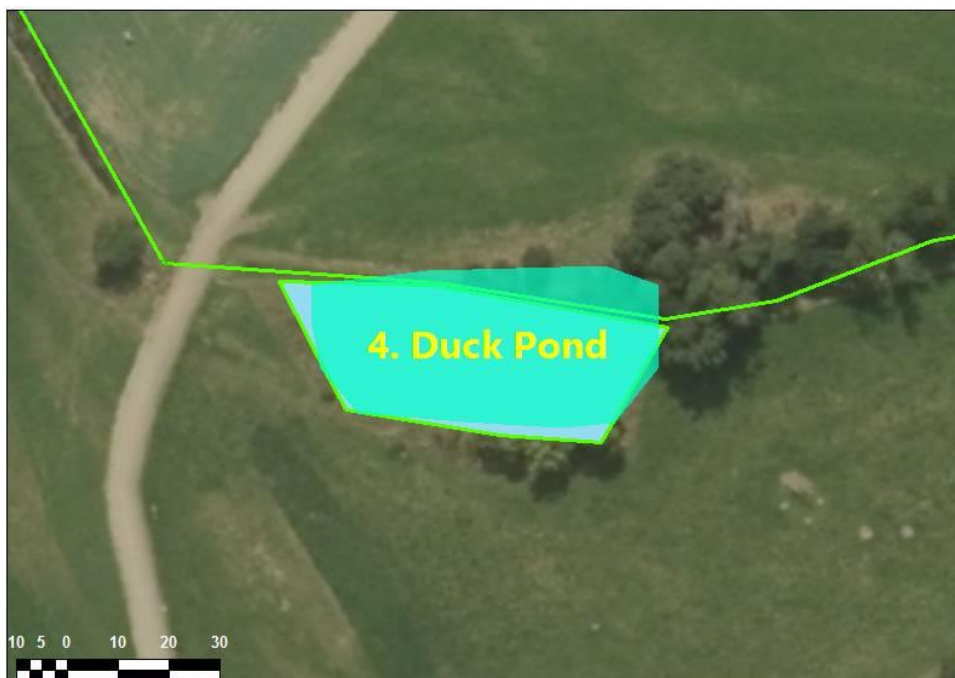


Photo 4 – Terrace Creek – Flax Riparian Margin.

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

4. Duck Pond



Description: Duck pond located to the east of the main dairy lane. The southern and eastern sides of the pond have been planted with a range of exotic and native trees/shrubs such as willows, maple trees and flax. The pond can be further enhanced by undertaking planting around the northern and western margins. This could comprise a range of plants from the species listed in Appendix 1. Close to the water edge plants should be at 1-1.5m spacings and at 2m spacings further back (larger trees and shrubs).

Fencing Status: Permanently Fenced

Vegetation Status: Planted

Flood Risk: Low

Proposed Area: 0.19ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 31% (588 m²): 1.5m plant spacings - approximately 300 plants
- Upper Zone 30% (570 m²): 2.0m plant spacings - approximately 200 plants
- Grass Buffer Strip 39% (740 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 50% Planting Progress
- Planting 100% - 2021



Photo 5 – Duck Pond – Eastern Side

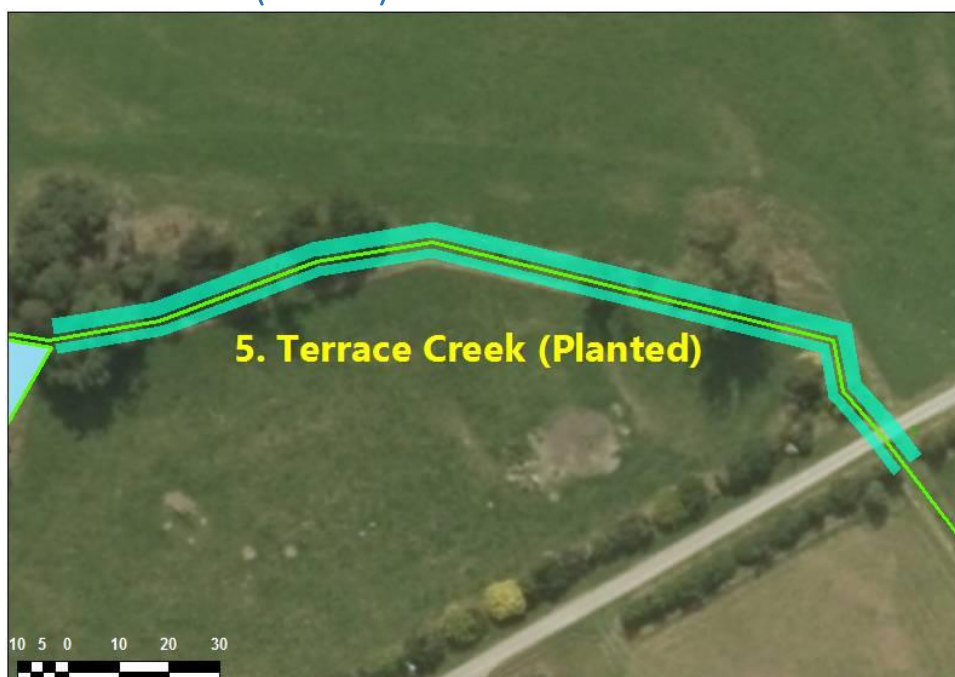


Photo 6 – Duck Pond – Western Side

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

5. Terrace Creek (Planted)



Description: Section of Terrace Creek below the duck pond. The south side has a 3m margin that is maintained in a mixture of rank grass and exotic trees. The north side has a smaller 2m riparian margin with similar vegetation. The exotic trees provide good shading of the stream, which is largely weed free in this area. No additional planting is planned.

Fencing Status: Permanently Fenced

Vegetation Status: Planted

Flood Risk: Low

Proposed Area: 0.09ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 0% (0m²)
- Upper Zone 50% (474 m²):
- Grass Buffer Strip 50% (474 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 100% Planting Progress

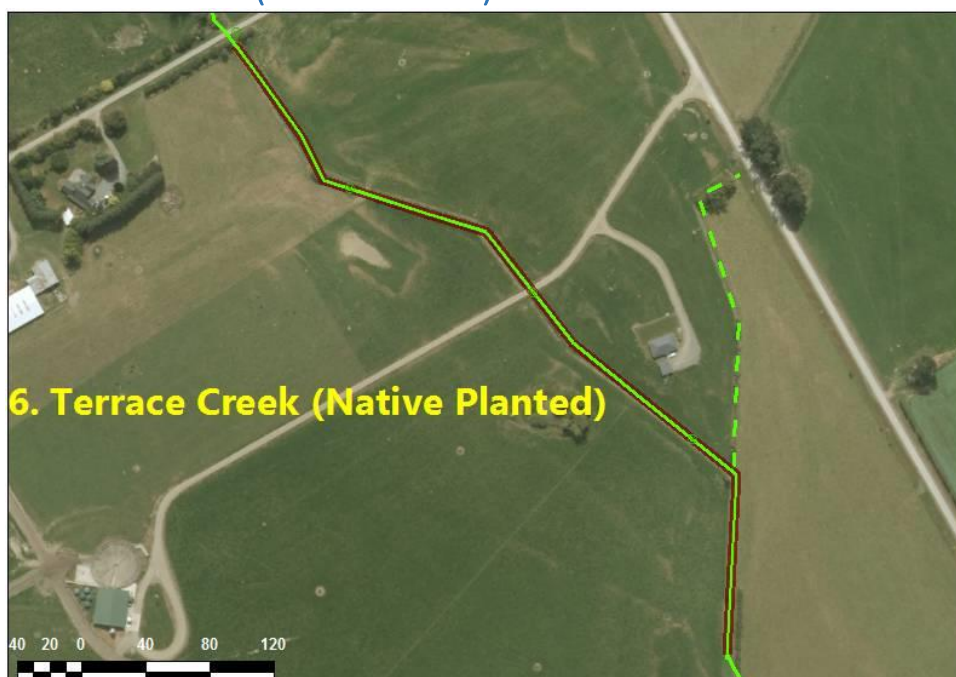


Photo 7 – Terrace Creek – Exotic Trees

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

6. Terrace Creek (Native Planted)



Description: Middle section of Terrace Creek. Riparian margins of 2m on both sides of the waterway. The eastern side is planted in flax which supports a large community of animals, providing shelter and an abundant food resource. Tui, bellbirds, saddlebacks, geckos and several types of insects enjoy nectar from flax flowers. The flax provides good shading of the creek and habitat for in stream fish and macroinvertebrates. The western side of the stream is maintained in rank grass. In this section Terrace Creek is largely weed free due to the shading provided by the riparian vegetation and good water flows within the Creek.

Fencing Status: Permanently Fenced

Vegetation Status: Native Dominated

Flood Risk: Low

Proposed Area: 0.22ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 0% (0m²)
- Upper Zone 50% (1077 m²):
- Grass Buffer Strip 50% (1077 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 100% Planting Progress



Photo 8 – Terrace Creek – Rank Grass Riparian Margin leading into Flax.



Photo 9 – Terrace Creek – Flax Riparian Margin



Photo 10 – Terrace Creek – Flax Riparian Margin

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

7. Eastern Tributary



Description: Small non defined waterway flowing from the road side into Terrace Creek. There are well established Macrocarpa trees present beside Boyle Road and flax planted at the bottom end of the stream. In the middle stretches the 2m riparian margins are maintained in rank grass. No additional planting is planned in this area.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.08ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 18% (288 m²):
- Upper Zone 0% (0m²)
- Grass Buffer Strip 82% (1312 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 100% Planting Progress



Photo 11 – Eastern Tributary

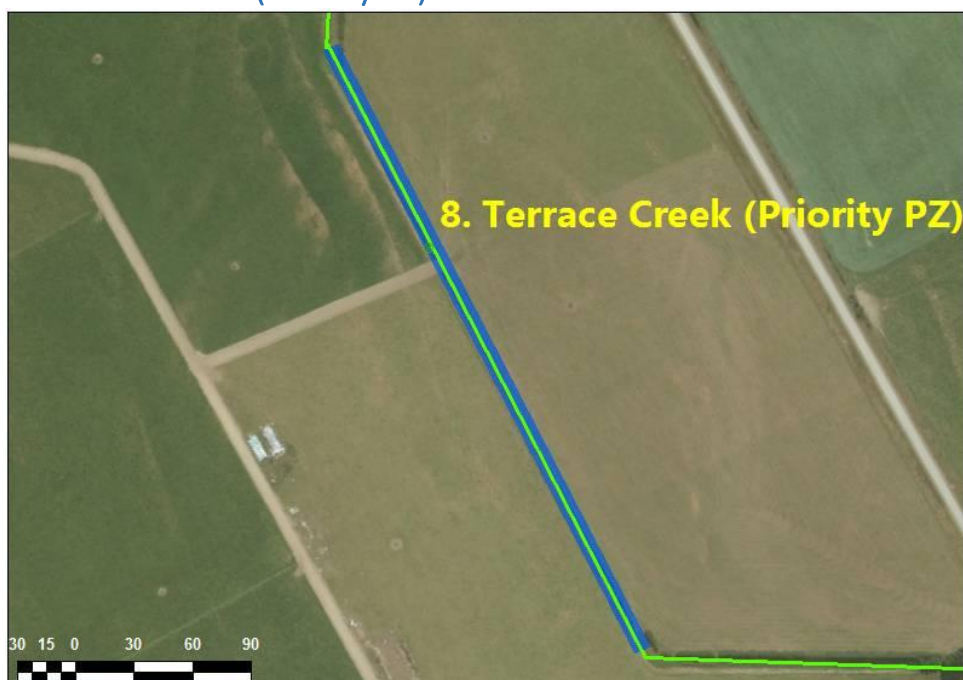


Photo 12 – Eastern Tributary

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

8. Terrace Creek (Priority PZ)



Description: Priority Planting Zone along Terrace Creek. This is a straight section of creek with a well battered 4m riparian margin on the west side, which is ideal for planting. It is recommended two rows of plants are utilised. One row close to the water's edge at 1-1.5m spacings comprised of carex secta and/or red tussock and a second row at 2m spacings comprised of toetoe, cabbage trees, broadleaf and other upper bank plants selected from the list in Appendix 1. The eastern bank has a 3m riparian margin maintained in rank grass.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.24ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 34% (831 m²): 1.5m plant spacings - approximately 554 plants
- Upper Zone 33% (807 m²): 2.0m plant spacings - approximately 403 plants
- Grass Buffer Strip 33% (807 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 0% Planting Progress
- Planting 100% - September, 2018



Photo 13 – Terrace Creek – Priority Planting Area (North)

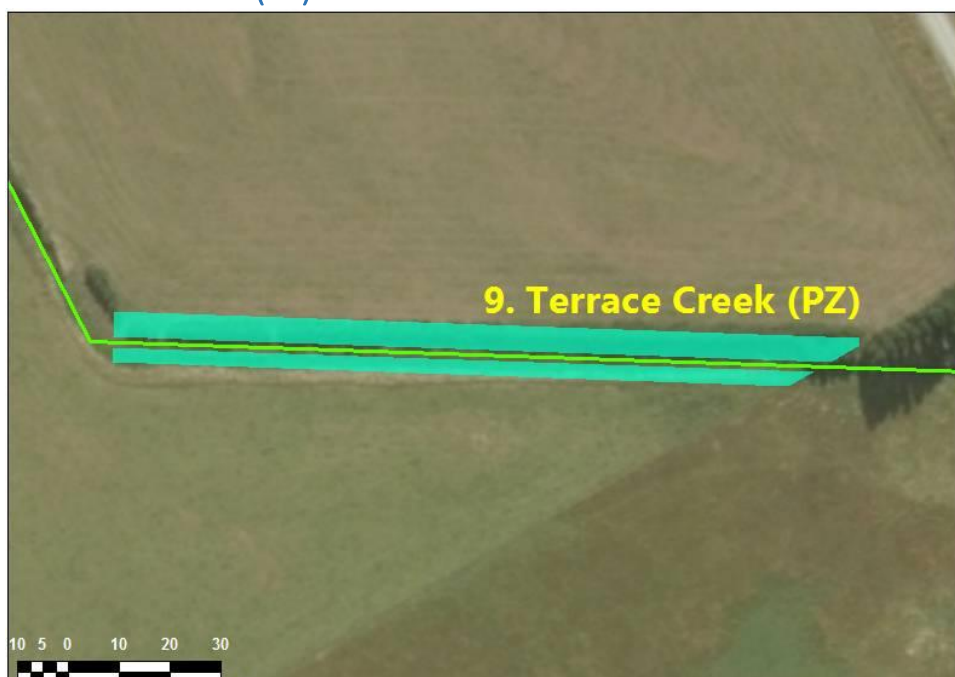


Photo 14 – Terrace Creek – Priority Planting Area (South)

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

9. Terrace Creek (PZ)



Description: Terrace Creek planting zone. Macrocarpa and poplar trees are already well established along the northern side of the stream, however there is a large open area between the trees and the creek (3m) that could be planted in lower bank plants such as carex secta and toetoe (1-1.5m spacings). Overall the riparian margins are 5m on the northern side and 3m on the southern side (rank grass). Filling in the gap between the Macrocarpa trees and the creek will improve in stream habitat and provide additional bank stability.

Fencing Status: Permanently Fenced

Vegetation Status: Planted

Flood Risk: Low

Proposed Area: 0.11ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 31% (351 m2): 1.5m plant spacings - approximately 250 plants
- Upper Zone 36% (408 m2):
- Grass Buffer Strip 33% (374 m2)

Proposed completion dates:

- Fencing the RMU - Done
- 50% Planting Progress
- Planting 100% - September 2019



Photo 15 – Terrace Creek – Southern End

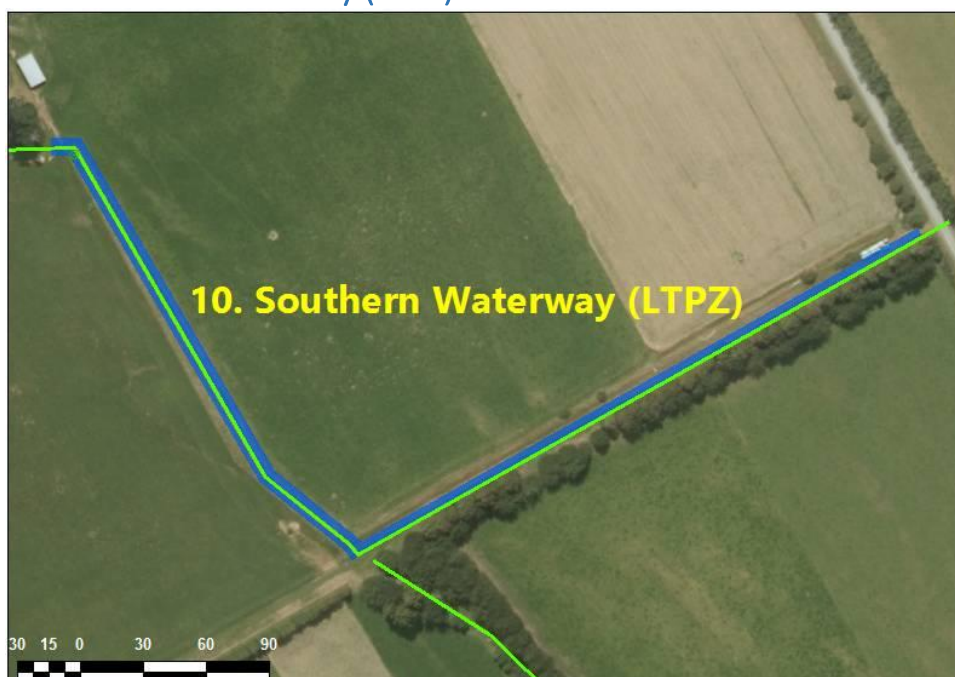


Photo 16 – Terrace Creek – Southern End

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

10. Southern Waterway (LTPZ)



Description: Long Term Planting Zone. Large 3-4m riparian margins on both sides of creek that are currently maintained in rank grass. This provides some limited shading and in stream habitat and good filtering of any overland flow off adjacent paddocks. Long term, this area could be planted with two rows of plants, one row of lower bank plants at 1-1.5m spacings and a second row of upper bank plants at 2m spacings. See Appendix 1 for plant details.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low



Proposed Area: 0.3ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 34% (1012 m²): 1.5m plant spacings - approximately 674 plants
- Upper Zone 33% (982 m²): 2.0m plant spacings - approximately 491 plants
- Grass Buffer Strip 33% (982 m²)

Proposed completion dates:

- Fencing the RMU - Done
- 0% Planting Progress
- Planting 100% - September, 2025

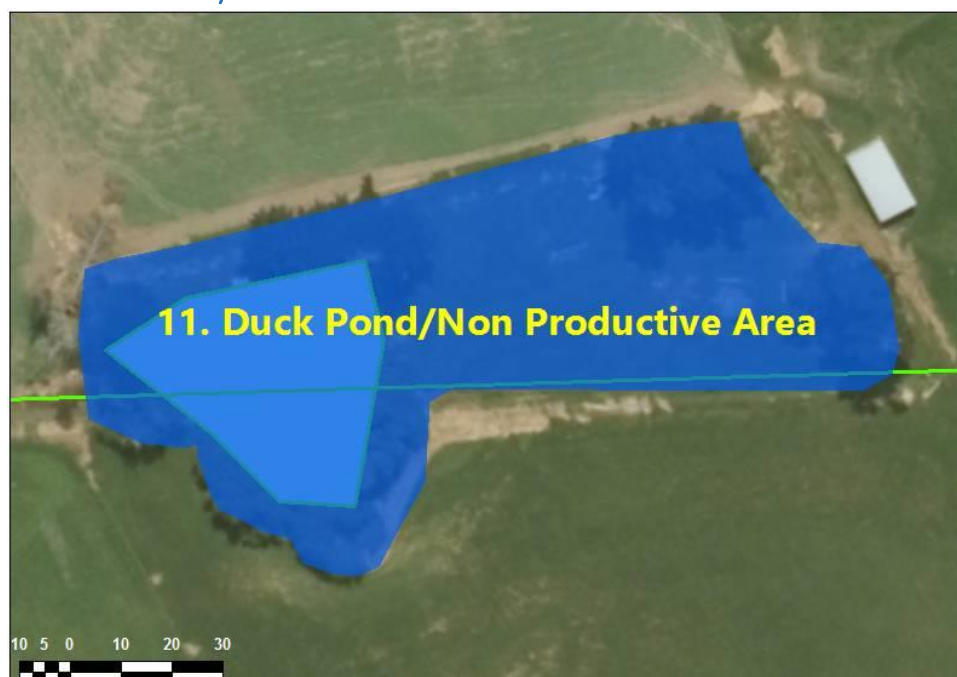


	<p>Photo 17 – Terrace Creek – Southern Waterway Future Planting Area</p>
	<p>Photo 18 – Terrace Creek – Southern Waterway Future Planting Area</p>

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

11. Duck Pond/Non Productive Area



Description: Duck pond with older willow trees around the outer perimeter moving through to a section of open non-productive land to the east. The waterway to the east of the creek requires permanent fencing over winter, currently area maintained in rank grass. There is a paddock side riparian margin of 2-3m. No additional planting planned in this area in the immediate future.

Fencing Status: Permanently Fencing Required – August 2018

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.77ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 34% (2602 m²):
- Upper Zone 33% (2525 m²):
- Grass Buffer Strip 33% (2525 m²)

Proposed completion dates:

- Fencing the RMU – August 2018



Photo 19 – Non-Productive Area & Temporary Fencing



Photo 20 – Duck Pond

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

12. Southern Waterway



Description: Small stream flowing through the southern section of the farm. This stream is less than 1m wide and normally doesn't flow in summer. Relatively large 3m riparian margins on both sides of the stream that are maintained in rank grass. These provide filtering of run-off from surrounding paddocks and some stream shading and in stream habitat. No planting planned in this section.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.42ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 0% (0m²)
- Upper Zone 0% (0m²)
- Grass Buffer Strip 100% (1600 m²)

Proposed completion dates:

- Fencing the RMU - Done



Photo 20 – Southern Waterway – Middle Section



Photo 21 – Southern Waterway – Middle Section

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

13. Southern Waterway



Description: Section of the Southern Waterway on the western boundary of the farm. There is a 2m riparian margin on each side of the stream. Maintenance is needed to remove gorse and reinstate a permanent fence. This is being completed over winter. Once gorse is removed and permanent fence installed the margins will be maintained in rank grass. No planting planned in this area.

Fencing Status: Temporary Fenced

Vegetation Status: Weed Dominated

Flood Risk: Low

Proposed Area: 0.07ha (refer to appendix 1 for zone descriptions and plant options)

Proposed completion dates:

- Fencing the RMU – August 2018
- Gorse Removal – October 2018



Photo 22 – Southern Waterway – Western End



Photo 23 – Southern Waterway – Temporary Fence & Area for Weed Control

Comments/Progress Record:

Prioritised Riparian Management Units (RMU) for 32653

14. Western Boundary Creek



Description: Western boundary stream on neighbour's farm. The stream has a 1m margin maintained in rank grass with the odd exotic tree. No planting planned in this section.

Fencing Status: Permanently Fenced

Vegetation Status: Rank Grass

Flood Risk: Low

Proposed Area: 0.07ha (refer to appendix 1 for zone descriptions and plant options)

- Lower Zone 0% (0m²)
- Upper Zone 0% (0m²)
- Grass Buffer Strip 100% (727 m²)

Proposed completion dates:

- Fencing the RMU - Done

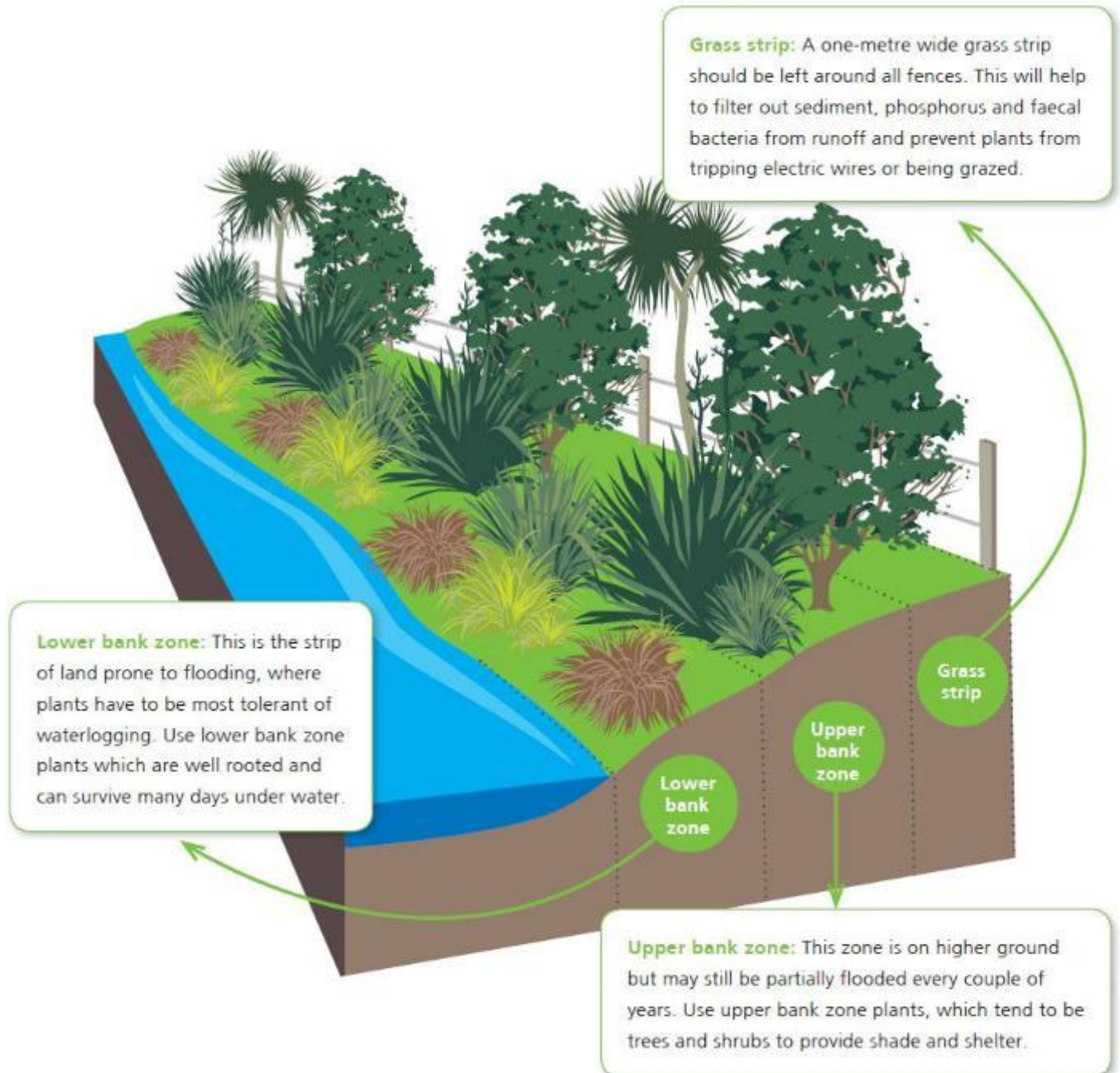


**Photo 24 – Stream on Western Boundary
(neighbours property)**

Comments/Progress Record:

Appendix 1:

Riparian Management Unit and planting “Zones”



Recommended plants Southland (Source: DairyNZ Riparian Management Plan (Southland))

FAST 5 PLANTS FOR SOUTHLAND



These 5 go-to plants are ideal to start your planting with – they are hardy, fast-growing, can be planted straight into pasture and don't require shelter. Ask your nursery for Eco-sourced plants that are hardiest.

Table of Riparian Plants

Tolerates key: ☀ Full sun 🌿 Wind 🌫 Salt wind ❄ Frost hardy 💧 Poorly drained soil (boggy) ☀ Dry soil conditions
Benefits key: 🐦 Attracts birds 🐝 Attracts bees 🌱 Slope stabilisation 🌊 Filters runoff 🌳 Shade 🐟 Fish habitat

Plant name	Type	Tolerates	Benefits	Size (height x width)
Lower bank zone				
Space 1-1.5 m between plants				
Cabbage tree (tī kōuka) Cordyline australis	Tree	☀ 🌿 🌫 ❄ 💧	🐦 🐝 🌱 🌊	10 x 3 m
Purei Carex secta	Sedge	☀ 🌿 🌫 ❄ 💧	🌱 🌊 🐟	0.75 x 1 m
Red tussock grass Chinochloa rubra	Grass	🌿 ❄ 💧	🌱 🌊	1 x 1 m
Swamp sedge (pūrei) Carex virgata	Sedge	🌿 🌫 ❄ 💧	🌱 🌊 🐟	0.75 x 1 m
Toetoe Austroderia richardii	Grass	🌿 🌫 ❄ 💧 ☀	🌱	1.5 x 1.5 m
Upper bank zone				
Space 1.5-2 m between plants				
Mingimingi Coprosma propinqua	Shrub	☀ 🌿 🌫 ❄ ☀	🐦 🌳	4 x 1.5 m
Swamp flax (harakeke) Phormium tenax	Other	☀ 🌿 🌫 ❄ 💧	🐦 🐝 🌱 🌊	2 x 2 m
Black matipo (kōhūhū) Pittosporum tenuifolium	Small tree/tree	☀ 🌿 ❄	🐦 🌱 🌳	8 x 3 m
Broadleaf (kapuka) Griselinia littoralis	Tree	☀ 🌿 🌫 ❄ ☀	🐦 🌳	10 x 3 m
Kahikatea* Dacrycarpus dacrydioides	Tree	☀ 🌿 ❄	🐦 🌳	40-60 x 4 m
Karami Coprosma robusta	Shrub/small tree	☀ 🌿 ❄ 💧	🐦 🌱 🌳	4 x 1.5 m
Kokomuka Hebe elliptica	Shrub	🌿 🌫	🐦 🐝 🌳	1.8 x 1 m
Koromiko Hebe salicifolia	Shrub	☀ 🌿 🌫 ❄	🐦 🐝 🌱 🌳	1.8 x 1 m
Kotukutuku* Fuchsia excorticata	Tree	☀	🐦 🌳	10 x 3 m
Lemonwood (tarata) Pittosporum eugenoides	Tree	☀ ❄ ☀	🐦 🌱 🌳	9 x 4 m
Lowland ribbonwood (manatu) Plagianthus regius	Tree	☀ 🌿	🌱 🌳	10 x 3 m
Mānuka Leptospermum scoparium	Small tree	☀ 🌿 🌫 ❄ ☀	🐦 🌱 🌳	4 x 1.5 m
Tōtara* Podocarpus totara	Tree	☀ 🌿 ❄ ☀	🐦 🌱 🌳	20 x 4 m
Twiggy tree daisy Olearia traversii	Shrub	☀ 🌿 ❄ ☀	🐦 🌳	4.5 x 4.5 m
Wineberry (makomako)* Aristotelia serrata	Shrub/tree	☀	🐦 🐝 🌱 🌳	8 x 3 m

*Plant these species into existing vegetation or 2-3 years after initial plantings so they have shelter to grow.

For more information on plants to consider and managing a planting project please visit <http://www.dairynz.co.nz/media/660475/dairynz-riparian-management-southland.pdf>