

# **Te Kakau Stream Management Plan Update**

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## **Introduction**

Since the Te Kakau Stream Management Plan was published in March 2005 Tasman District Council has been implementing several of the actions recommended in the plan. This paper describes those actions and the results from information that has been produced. This information has necessitated the need to review some of the actions. Expert external advice has also been sought to confirm the recommended strategy. This strategy was put to a meeting where all landowners of property adjacent to the waterway were invited and a summary of this discussion provided.

## **Background**

The Te Kakau Stream Management Plan stated the following objectives for improving the health of this waterway including the following:

1. Involvement of the community in the day to day management of the Tasman District Council streamside reserves
2. Improved aquatic and streamside habitat and recreational opportunities and amenity
3. Extension of reserve areas if suitable land becomes available
4. Improved water quality
5. Improved natural flow
6. Keep tidy and free from rubbish
7. Control or eradicate invasive aquatic weeds

### Management Plan Actions Recommended and Achieved:

ACTION	ACHIEVEMENTS FROM MARCH 2005 TO MARCH 2008
Monitoring of water quality and aquatic ecology	Water quality monitored quarterly from Feb 2005 to Jul 2006 at Haldane Rd and Rose Road. Water quality meters measuring temperature, dissolved oxygen, conductivity and pH were installed at Haldane Rd and Feary Cres for about 2 weeks in Feb 2006. Fish surveys were conducted in spring 2006 and summer 2008 at two approx 200m reaches: one upstream of Haldane Rd and one upstream of Feary Cres.
Fencing farmed areas	Bernal Reilly's farm has been fenced for the full length of the waterway and the Rose Farm is soon to be fenced. Assistance by TDC has been provided
Streamside planting for wildlife corridors and amenity	Considerable streamside planting has been achieved on the Te Kakau Reserve (a TDC reserve) to 150-200m upstream of Haldane Rd. Some Weeping Willows have been planted on the Rose Farm. Various other landowners have been planting on a small scale various species down the waterway.
Improving natural flow by building a bridge at Haldane Road and deepening the stream under it	Bridge scheduled to be built by Christmas 2008 (TDC Engineering Dept)
Improving natural flow by poisoning, trimming and/or removing Crack Willow growing in the streambed and continue on-going surveillance and control.	Some willows have been removed on the Rose Farm for approx. 100m downstream of Rose Road in order to protect fences that are soon to go in.
Rubbish management using community volunteers and adopt-a-stream initiatives	Not achieved as far as is known.
Investigate new ways of managing aquatic weeds such as using weed matting and narrowing and deepening the stream. Plant trees to shade the waters of the stream where practicable.	Control methods using weed matting were trialled from Sept 2006 to March 2008. These trials appear to have been successful in eradicating <i>Lagarosiphon</i> and other aquatic weeds. Planting trees to provide stream shade have been undertaken in the TDC reserve upstream of Haldane Road but it will be several decades before this will achieve any significant shade. Underplanting of willows has been undertaken upstream of Feary Cres on the Pratter property.
Publicity – particularly about rubbish management, weed issues	Publicity on rubbish management has yet to be achieved. Publicity on water quality and aquatic ecology has been undertaken with an article in the local paper and a public meeting (March 25, 2008). Signs about the weed matting trial were placed at the Rose Road trial site.

### **Key Results of from Monitoring:**

- Low dissolved oxygen a major problem in the waterway in summer
- Reduced quality of in-stream habitat by choking from aquatic weeds
- Some important fish values in the waterway, particularly Banded Kokopu, upstream Feary Cres. Spring runs of inanga making it right up the waterway unfortunately by summer-time they are displaced by the low dissolved oxygen
- In the last 2 years the dominance of *Lagarosiphon* in the upper section of the waterway (down to Feary Cres) appears to have reduced and other water weeds are causing almost as much of an issue. This situation may be due to the following factors:
  - Reduced flows in the stream meaning greater areas of stream with very low water velocity
  - Increased build-up of organic matter from *Lagarosiphon* has provided substrate suitable for growth of other aquatic plants.
  - *Lagarosiphon* has created a matrix by which other aquatic plants can grow over

Natural disturbance (spates) is a key component in helping to maintain the character of stream in a perpetual rejuvenated state of early succession that avoids more competitive (and undesirable) climax weed species establishing. The combination of reduced flow volume and absence of flushes in Te Kakau stream has led to inevitable succession towards climax species with stable submerged plant growth (milfoils and *Lagarosiphon*) further slowing down flows, causing increase silting. In combination this has led to ideal conditions for the establishment of sprawling marginal species, as occurs presently in the uppers reaches to downstream of Feary Cres. This is the situation in open sunlight, while under the shade of willow trees there is insufficient light for abundant aquatic plant growth, however increased siltation is apparent along the entire length of this stream and the original gravel beds are now mostly buried and no longer forming part of the character of this stream.

### **Results from Weed Mat Trial**

The covering of the stream with weed matting was found to be a successful method for controlling aquatic weeds (at least 1 year deployment needed). Weed matting in some areas is unlikely to be practical and chemical methods may be needed to supplement the process. The cost of eradication of *Lagarosiphon* using weed matting was found to be about \$3000/100m.

## Control Options of Excessive Growth of Aquatic Plants

CONTROL OPTION	PROS	CONS	COMMENTS
Weed mat	No question about any chemical residues	Relatively high cost (\$3000/100m)	
Chemical (diquat)	Good for spot application for discrete areas of incursion Relatively low cost (\$200/100m)	Not in favour with some in the local community	Diquat must be applied once then again within 6-8 weeks). Toxicity well below that of swimming pool water.
Shading using streamside plantings	A good long-term solution for both aquatic plant control and fish habitat provision	The difficulty and effort required to meet all landowners requirements	
Inducing a flood through the waterway	A natural method of cleaning the stream. Gets rid of sediment at the same time.	A lot of planning required to ensure no important land is flooded. Resource consents required.	Last significant flood through this area was in 1983

If *Lagarosiphon* was controlled (by weed mat, chemical or other means), other aquatic plants are most likely to take their place and cause similar problems with water quality but to a lesser severity.

### Where to from Here:

Considerable discussion and peer review of the options to improve the health of the waterway has been undertaken using experts, including aquatic plant specialist Dr John Calyton from NIWA, Department of Conservation, and Tasman District Council biosecurity and resource science staff. Feedback on these options from landowners living adjacent to the waterway was provided at a public meeting on 25<sup>th</sup> March, 2008, as well as letters to Council and informal discussions. Approximately 8 landowners attended out of about 60 landowners formally invited to the meeting.

The preferred option to control the aquatic weed problem and provide for a healthier waterway in the long term is to provide stream shading by streamside planting. Willow trees should be under-planted with other more desirable species and then poisoned. This is mostly a function of cost and effectiveness in the long term. A variety of size and shape of streamside shading plants could be planted depending on the desires of the individual landowners. The plants generally favoured for streamside planting include: Pittosporum, Ribbonwood, Beech, Totara, Carex.

Stream narrowing could also be used in places where there is demonstrated justification, community support and funding available.

TDC is prepared to facilitate and manage a project to enhance the health of this waterway along the lines of streamcare groups elsewhere in the District. However, such a project will not go ahead without proven community support. This means that there must be the will amongst the majority of landowners to buy into the process by signing up to funding agreements (eg through the Cobb Mitigation Fund) and assistance in planting or weeding streamside plants along the stream. TDC has many other waterways also deserving of rehabilitation.

Another key driver to decreasing water quality is likely to be the lowered ground water table contributing to lowered water flow in the stream. It appears that this is related to the bed level of the Takaka River which has dropped up to 1m in the last 40 years. Gravel takes in the Takaka River have been restricted considerably in recent years. Options for raising the water table (or at least arrest the falling groundwater levels) will be investigated by Tasman District Council.

If there was reasonable community support for this project, a facilitator would need to be employed to work through all the very different preferences that individual landowners have voiced for their 'patch'. For example, we know that some people want low plants to ensure sun in the house and garden, flood carrying capacity, as well as views to stream and farmland and reducing leaf build-up in gutters.

Without providing shade trees we are not going to fulfil the goals the community expressed (through the management plan) to improve the health of the whole waterway.

## Appendix One – Observations from Stream Walk 25<sup>th</sup> March 2008

### A1.1 Aquatic Plant List Including Dominance

PLANT	ROSE RD TO BICKLEYS	ALONGSIDE FEARY CRES RESERVE	ALONGSIDE HALDANE RD RESERVE	COMMENTS
Watercress	**	**		
Swamp Willow Weed	**	**	*	
Forget-me-not	**	**	**	
<i>Myriophyllum triphyllum</i>	***	*		
<i>Myriophyllum propinquum</i>	-	*		
<i>Lagarosiphon</i>	*	*	****	
Submerged Willow Herb (Polygonum)	*			
Callitriche	*	*		
Nitella	*	*	*	

Key: Relative dominance (cover over water)

- 4 Red Asterisks: >50%
- 3 Orange Asterisks: 30-50%
- 2 Yellow Asterisks: 10-30%
- 1 Green Asterisk: <10%

### A1.2 Fine Sediment Thickness on Bed of Waterway

- Rose Rd – 300mm average, over 500mm in deeper areas
- Feary Cres - 200mm average, over 500mm in deeper areas
- Upstream Haldane Rd – Average over 400mm
- Downstream Haldane Rd – average over 600mm

## Appendix 2 Groundwater Levels around Takaka

- Wigo and Mason Creeks used to flow about 20 years ago but are now dry and grassed over. These creeks formed part of the Takaka River delta and lie to the east of SH60 and originating from about 2km south-east of the Takaka River.
- Groundwater levels in central Takaka (bore at Tasman District Council office) appears to show a decline in water levels in the order of 200-300mm.
- Bed level of Te Kakau Stream at the confluence with the Takaka River used to be relatively level with the Takaka River and now it is a steep ramp down to the river.

### **Appendix 3: Observations at Lake Kilarney**

A brief investigation of Lake Kilarney was undertaken using snorkelling gear on 25<sup>th</sup> March, 2008. The following observations were recorded:

- Steep slope from bank into the water
- No macrophytes emerging to surface. This may be due the control by Mute Swans in the past 6 months.
- *Lagarosiphon* is the dominant macrophyte - generally 4m tall in water column.

## **Appendix 4: Other General Aspects to Aquatic Weed Control**

- Always difficult to deal with aquatic plant control in mud-bottomed areas
- To get rid of *Lagarosiphon* will generally involve killing all aquatic plants because control methods are not selective and *Lagarosiphon* will be hidden within the matrix of other plants.
- 28 species of native aquatic plants in NZ, none of which caused water quality or other issues until the forest cover was opened up.
- Need at least one year of shading with weedmat for effective control. Where there are artesian springs overlap weed-mat sheets such that it shades but allows water flow out between the sheets.
- The most important factors in chemical control of aquatic plants are:
  - Cleanliness of plants (silt affects absorption)
  - Clarity of the water (consumes chemical otherwise targeted to the plants)
  - High dissolved organic carbon (affects adsorption)
  - Plant in the wrong stage of life-cycle
- Do pre-tests on water quality (turbidity & aquatic plant wash and turbidity test) prior to application of chemicals
- Diquat is not affected by temperature, although summer decay rates are high. Test strips available to determine when drinking water standards are met.
- Endothal: - needs long contact time (3-4x that of diquat); don't use endothal pellets where there is soft sediment on the bed (likely to be trapped in sediment with less chemical available for uptake by the plant stems)
- *Glyceria* – 12-15ml/L glyphosate is best. Submerged *Glyceria* is not easy to treat
- *Lagarosiphon* control needs a double-hit – once and then repeat in 6-8 weeks. Between the first and second spray there may be 200-500mm of plant re-growth.
- *Hornwort* – is a late-season developer (March-April) so it is usually best to wait until this time to control. However, if you see some you should spray it.