MARBELLUP SUB-CATCHMENT FORESHORE CONDITION SURVEY

WATER & RIVERS COMMISSION
SOUTH COAST REGION
2001

MARBELLUP SUBCATCHMENT FORESHORE CONDITION SURVEY

In September and October 2000, Julie Pech, Environmental Officer with the Water and Rivers Commission, surveyed most of the Marbelup Brook and tributaries within the Marbelup Water Reserve Catchment. The survey results are available now available on a colour map.

Thank you to all involved who took valuable time out of your workday to show me the tributaries on your property. This is much appreciated and has enabled the Water and Rivers Commission and the Torbay Catchment Group to provide a "whole of catchment" summary, of foreshore vegetation condition throughout the Marbelup Water Reserve Catchment.

Approximately 60 landowners took part. Not all landowners contacted wished to take part in the survey, so recent aerial photographs were used to complete the survey of foreshore condition.

Waterways condition in Marbelup Catchment

Significant areas of waterways vegetation in the catchment are actually in pretty good condition. This is great news for water quality and the future health of Marbelup Brook if we can maintain and even increase the extent of waterways vegetation which has a good condition rating.

Protection of the vegetation along Marbelup Brook and tributaries is increasingly important with growing development and water resource pressures facing Marbelup Catchment.

A few points to note when you look at the map and "Summary Statistics" on the map.

- 30% of Marbelup Catchment waterways are in pristine condition (dark blue waterways on the map) ie. can't get much better than this! As you can see from the map, most pristine areas are contained within the reserve system, including Westrail and Department of Conservation reserves. Some privately owned properties have waterways in pristine condition.

- 36% of Marbelup Catchment waterways are in B Grade condition (indicated as dark green waterways on the map). Most B Grade waterways have a degree of weed invasion, but on the whole have a good overall vegetation coverage. Vegetation buffers along streams are of course very important in taking up nutrients from paddock runoff, as well as stabilising soil and banks to minimise erosion.

- 7% of waterways in the catchment are erosion prone (indicated as red waterways on the map) and will remain so if left unvegetated, unfenced and with unlimited stock access.

- Waterways classified as Artificial Drains (16% of the catchment waterways) are underestimated in this survey, that is the drainage system on privately owned land is more extensive than the brown lines shown on the map. Artificial drains were not assessed for vegetation or erosion condition.

- 12% of the Marbelup Catchment tributaries are classified as pasture swales (yellow waterways on the map). These areas have no defined stream channel, however they are the headwaters of Marbelup Brook and tributaries, where paddock runoff starts to collect and runs into channels. Pasture swales often go unrecognised as a part of the stream system, however they collect and contribute significant quantities of water Marbelup Brook.

We would like to update this map from time to time

- To record changes in waterways vegetation condition (improvements or further degradation).

- To keep a record of how much fencing has been completed along all tributaries.
- To use this information to support funding applications to carry out much needed waterways repair work in targeted areas throughout Marbelup catchment.
- To target spending so that funds are allocated to the areas that need it most.

The Water and Rivers Commission and the Torbay Catchment Group have already allocated more than $8,000 to landowners for fencing, stock crossings, and stock watering points.

More funding is available and all landowners in Marbelup catchment are eligible to apply for these funds. Just fill in the enclosed application form.

If you have any questions on the results of the survey or the confidential report undertaken for your own property, or if you wish to discuss any proposed fencing or planting projects, please contact me at the address shown.

Again, thank you for your assistance with the survey and I look forward to continuing to work with you to protect the waterways and water quality of Marbelup Brook and tributaries.

Julie Pech
Environmental Officer
Water and Rivers Commission

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Mrs Bowman and Tim Bowman

Location number: 533
Survey Method: On-ground assessment with landowner.
Catchment location: Floodplain, Lower Torbay Catchment
Survey conducted: August 2000

This drain is an important tributary to the Water Corporation's Marbelup High Level Drain which discharges into Torbay Inlet. Bank erosion is contributing sediment and nutrients downstream. The system here urgently requires a management plan to reduce the transport of sediment and nutrients to Torbay Inlet.

ISSUES	COMMENTS
Fencing	Unfenced; cattle have unlimited access to watercourse.
Soil and banks	Artificial drainage channel approx 1-1.5 metres wide. The incised, stable channel. Drain banks are being actively eroded where cattle have trampled to access drinking water.
Vegetation	Pasture coverage is to the drain embankment. In some places, taylorina is the only vegetative cover stabilising the embankment. Some native sedge / rushes stabilise the channel. At the downstream property boundary and junction with the Water Corporation drainage reserve, native vegetation is dense and dominated by Coastal Saw-Sedge (*Gahnia trifida).*
Foreshore condition	***Drain:*** Foreshore condition is D Grade with weeds dominant. ***Junction of drain with Water Corporation drainage reserve:*** B1 Grade vegetation. Channel condition stable and well vegetated.
Weeds	Taylorina, blackberry and inkweed. Lack of a dense native understorey allows unrestricted access for Taylorina and blackberry control. Taylorina is the dominant bank vegetation. Small blackberry infestations are isolated at this stage.
Crossing	Good stock and vehicle crossover is in place.

Eroding banks along the drain would stabilise and revegetate rapidly if stock were excluded. This will reduce sediment and nutrient transport downstream into Torbay Inlet. Stock would also benefit from the shade and shelter provided. Sedges and rushes allowed to regrow in the channel would filter sediment and nutrients. Studies show that stock benefit from watering at troughs instead of from polluted drain water.

MANAGEMENT RECCOMENDATIONS for Mrs Bowman and Tim Bowman

1. Fence and exclude stock from the watercourse to prevent further erosion and reduce downstream impacts of sediment and nutrient transport.

2. Water stock from troughs to improve their health and prevent further bank erosion.

3. Allow drain banks to repair and stabilise through the regeneration of native vegetation.

4. Control taylorina and blackberry infestations in conjunction with upstream landowners.

5. Allow re-establishment of natural riparian vegetation, especially native reeds, rushes and sedges, to assist with bank stabilisation and nutrient and sediment stripping.

6. Fence and protect Coast Saw-Sedge at junction of drain and Water Corporation reserve

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

The foreshore condition assessment method used in this survey is described in the Water & Rivers Commission Report No. RR3, October 1999 *"River Restoration: Planning and Management: Foreshore condition assessment in farming areas of south-west Western Australia"*.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for WATER CORPORATION

Location: Water Corporation Drainage Reserve
Survey Method: On-ground assessment.
Catchment location: Floodplain, Lower Torbay Catchment
Survey conducted: August 2000

The Marbelup High Level Drain flows directly into Torbay Inlet. The channel lies within the Water Corporation Drainage Reserve and forms part of the Albany Drainage District.

ISSUES	COMMENTS
Soils and banks	Deeply incised but stable channel. Very steep banks, vertical in sections. Steep banks are sandy and subsiding where there is no vegetative cover. Vertical banks are hard grey clay and appear stable. Topsoil layer to 30 cm is visible from vertical profile. Some sections of the drainage reserve are unfenced, with stock from adjacent properties having unlimited access to the drains. Banks along these sections are denuded through stock trampling and are actively eroding. Stock should be excluded by fencing out, to prevent further erosion and reduce downstream impacts of sediment and nutrient transport.
Vegetation	The land on either side of the drain where fenced within the drainage reserve has vegetation in good condition. Banks colonised with sedges, rushes. Outer banks vegetated with planted shrubs and trees. The Water Corporation access and maintenance track located on the northern bank 5 metres from the drain, is kept clear of vegetation.
Foreshore condition	Constructed drain which has B Grade vegetation, with weeds being about as abundant as native species in the understorey.
Special features	The drain carries all flow from the Marbelup Water reserve to Torbay Inlet, and therefore carries large volumes of water at high velocity during high flow periods. Along sections, this drain provides a high level of fauna habitat due to well-developed riparian vegetation on the banks, drainage easement and within the drain channel. The only features that limit the habitat diversity in this drain are the straight channel form and steep banks.

MANAGEMENT RECOMMENDATIONS for Water Corporation Drainage Reserve

1. Fence drainage reserve to prevent stock trampling, soil subsidence and bank erosion.

2. Adjacent landowners to install off-stream watering to improve stock health and safety.

3. To assist with bank stabilisation, allow drain banks to revegetate with local clumping species of sedges and rushes so that flow and function of the drain is not compromised.

4. Allow vegetative cover rather than clearing vegetative cover periodically to "maintain drainage function" as this destabilised the drain banks, mobilising large quantities of sediments and nutrients which are transported to and deposited in Torbay Inlet, further degrading the water body.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for

Graeme Heighton

Location number: 483
Survey Method: On-ground assessment with landowner.
Catchment location: Floodplain, Lower Torbay Catchment
Survey conducted: October 2000

Graham has made excellent progress in working to protect his section of Marbelup Brook. Since purchasing the property two years ago he has progressively been fencing the Brook to exclude cattle; actively carries out weed control and is revegetating areas where the sandy embankments have been denuded and eroded.

ISSUES	COMMENTS
Fencing	50% of the watercourse is now fenced. Remainder to be fenced. Graeme has applied for funding assistance from the Torbay Catchment Group to continue this work.
Soil and banks	Steep sided, deeply incised channel, average width 5 metres. Prior to current ownership, stock had unlimited access to foreshore areas. Seasonal pedestrian traffic during the marron season is a significant problem: electric fences cut, native vegetation trampled, sandy banks denuded and subsequent erosion.
Vegetation	Where fenced, the steep banks generally have good coverage of native vegetation. Denuded banks have been covered with tea tree branches placed so that seeds will drop and germinate. Native seedlings have been planted. Five small properties abut the eastern foreshore along this section of Marbelup Brook, where the native vegetation is in good condition with few weeds visible and no actively eroding sites.
Foreshore condition	***Fenced section*** (downstream one third of property) is A3 Grade, with native vegetation dominant. A few native species have disappeared. ***Unfenced section*** B3 Grade, weeds dominate the understorey, but many native species remain. Some trees and large shrub species may have declined or disappeared altogether.
Weeds	Active control of kikuyu, taylorina and watsonia is carried out, particularly in areas undergoing revegetation.
Stock watering	Stock access to foreshore areas has been reduced to three main access areas. Construction and maintenance of stabilised stock watering points will be expensive and it may be difficult to achieve the degree of erosion control required, due to the incised channel and steep sandy banks.
Special features	Tree limbs and trunks *(*termed *large woody debris or LWD)* that have fallen into the brook have been angled so as not to increase flood risk or reduce the carrying capacity of the watercourse; but serve to reduce bank erosion and provide habitat for a range of in-stream fauna.

MANAGEMENT RECOMMENDATIONS for Graeme Heighton

1. Fence to exclude stock from entire length of watercourse.

2. Off-stream watering points are recommended for stock watering for this situation where banks are very steep and sandy, and the channel deeply incised.

3. Maintain current weed control practices.

4. Continue with planting and revegetation with native species.

Following the Marbelup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbelup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for

Monty and Leslie Walker

Location number: 660
Survey Method: On-ground assessment with landowner
Catchment location: Marbelup Water Reserve, Upper Torbay Catchment
Survey conducted: August 2000

The survey was carried out along the western foreshore of Marbelup Brook. Here, the riparian zone is densely vegetated, with the channel deeply incised, meandering and difficult to access. The eastern embankment of Marbelup Brook is vegetated with dense, impenetrable riparian vegetation forming a continuous remnant of native bush from the channel eastwards to the rail reserve.

ISSUES	COMMENTS
Fencing	Western foreshore is not fenced. Pine logs placed against dense riparian vegetation form an effective barrier to sheep along the western bank of Marbelup Brook, north of the house. Permanent stock proof fencing would be required to protect the waterway and associated vegetation if cattle were run on the property.
Soil and banks	Marbelup Brook: steep sided, deeply incised meandering channel. Well vegetated, stable banks. Shallow spoon drains and deeper established channels run west-east and divert paddock runoff into Marbelup Brook. Erosion points along the deep drains have been rock-stabilised to prevent further head cutting.
Vegetation	Healthy vegetation along main channel. Casuarina woodland with limited understorey at the southern end of the property is vulnerable to degradation if stock were re-introduced. This area would then require fencing. Good sedge / rush colonisation in some areas where constructed drains join with Marbelup Brook**.**
Foreshore Condition	B1 Grade. Weed infestations, but the understorey is predominantly native.
Weeds	Blackberry and pines along Marbelup channel. Some difficulty to survey for other weed species due to the density of the riparian vegetation. It is likely taylorina and arum lily have propagated along Marbelup Brook with infestation from paddock drains. Monty is gradually removing the numerous mature pines planted by previous landowners. Felled logs are placed to exclude stock from riparian vegetation.
Crossings	The land from the eastern bank of Marbelup Brook to the east boundary is dense bush which Monty does not access – crossings are not required. Several well-constructed culvert crossings provide access over the paddock drains which enter the main channel of Marbelup Brook.
Special features	**Good linkage to adjacent bush reserves** Dense riparian vegetation in good condition provides excellent linkage to bush habitat in adjacent Marbelup Nature Reserve, Westrail reserve and City of Albany gravel reserves.
Adjacent landuse	horticulture

MANAGEMENT RECOMMENDATIONS for *Monty and Leslie Walker*

1. Encourage sedge and rush establishment along new and established drainage channels to trap sediment, nutrients and pollutants and improve the quality of surface water runoff draining into.

2. To prevent "headcut" erosion and deepening of the new shallow drains, encourage the establishment of sedges and rushes which will stabilise the channel and embankments.

3. Ensure that the timing and careful application of appropriate horticultural sprays does not impact on the quality of surface water runoff draining into Marbelup Brook.

4. When carrying out chemical weed control along waterways, ensure appropriate "frog-friendly" sprays are used (eg Roundup Biactive) to protect aquatic fauna.

5. Control arum lily and taylorina infestations in established drains entering the Brook.

6. Fence riparian vegetation to exclude stock if landuse changes to pasture production.

Following the Marbelup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbelup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS - MARBELUP NATURE RESERVE

Location number: Loc 801 - CALM Reserve 24891
Survey Method: On-ground assessment.
Catchment location: Upper Torbay Catchment
Survey conducted: October 2000

Marbelup Nature Reserve is classified as an "A" Class Reserve for the conservation of flora and fauna. However, inappropriate uses have compromised the integrity of the reserve. Heavy human foot traffic resulting from seasonal marron fishing,is degrading the riparian zone within the reserve. The area of encroaching environmental weeds is expanding along the riparian zone and throughout the reserve. Infestations in new areas are caused by propagules carried by water and foot traffic.

Past use as an unofficial local rubbish tip and recent evidence of illegal liquid waste disposal, are inappropriate uses of the reserve. The extent to which unknown pollutants from these uses have impacted upon the water quality in Marbelup Brook, is unknown. This will require further investigation if the Marbelup Brook water source is to be used as a future drinking water source for the City of Albany and surrounding towns. The Marbelup Brook Catchment was classified as a Priority 3 Water Reserve for this purpose in 1986.

ISSUES	COMMENTS
Soil and banks	Human disturbance due to the impact of seasonal marron fishing activities has resulted in areas denuded of riparian vegetation, bare exposed soil and eroded banks.
Vegetation	Trampling has damaged the riparian vegetation along some sections of foreshore, resulting in areas of bare soil and completely denuded banks. Environmental weeds are dense along some foreshore sections and adjacent tracks. As environmental weeds typically have rapid rates of growth and propagate readily, the native vegetation is rapidly being crowded out and replaced by weed species. Away from trampled areas, the existing native vegetation appears healthy and in good condition.
Foreshore Condition	A3 Grade – slightly disturbed. Native vegetation dominates, but there are localised areas of human disturbance where the soil is exposed and weeds are relatively dense along banks and tracks. The native vegetation would quickly recolonise the disturbed areas if human activity was formalised and restricted to designated tracks, or if this activity declined altogether.
Weeds	Weeds including sweet pittosporum, Sydney golden wattle, taylorina, watsonia and kangaroo apple are dense in places along stream banks. However, it would not take significant effort to remove the weeds at this stage. If weed spread is left unchecked the understorey, which presently consists of predominantly native species, will rapidly lose its integrity.
Special features	Undisturbed sections of foreshore within the reserve are extremely valuable assets and represent a near-pristine stream environment. A waterway in this condition is as good as will be found today.

MANAGEMENT RECOMMENDATIONS for FORESHORE SECTIONS IN MARBELUP NATURE RESERVE (managed by CALM)

1. Designate formal access paths along foreshore areas to minimise erosion (this option proposed as it would be difficult to prevent access altogether).

2. Remove environmental weeds from foreshore areas and throughout reserve.

3. Formation of a "Friends of" group to promote greater appreciation of reserve values, discourage inappropriate uses, and implement weeding program.

4. Display signs eg "This is a community-managed reserve…" to encourage responsible use of the reserve. Interpretative signs to explain need for foreshore protection.

The foreshore condition assessment method used in this survey is described in the Water & Rivers Commission Report No. RR3, October 1999 *"River Restoration: Planning and Management: Foreshore condition assessment in farming areas of south-west Western Australia".*

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Tim Bratby and Helen Annice

Location number: 829
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: March 2001

In March 2001 Tim Bratby and Helen Annice made successful application for grant assistance from the Torbay Catchment Group to fence both sides of their watercourse. Tim and Helen heard about the scheme from neighbours.

ISSUES	COMMENTS
Fencing	Unfenced – cattle have had unlimited access to the waterway. The watercourse will be completely fenced during 2001.
Soil and banks	The sandy soil structure and embankments are easily broken down and eroded by cattle trampling as they access the watercourse. Further scouring of unstable and eroding banks, particularly on meander bends, occurred during the winter 2000 flood event.
Foreshore condition	B1 Grade. Pasture and weeds have become a significant component of the understorey vegetation. Although native species are dominant, a few have become replaced by pasture .
Vegetation	The remaining riparian vegetation (including eucalypts, teatree and casuarina) has a healthy appearance. Understorey species are sparse but should regenerate following fencing and exclusion of cattle. Sedges and rushes growing within the channel should regenerate and stabilise the channel once cattle are removed.
Weeds	Taylorina, blackberry and sweet pittosporum infestations are small, but will require continued control to contain the spread. Blackberry is sprayed. Removal of all weeds will be easiest before regrowth of the native understorey, following fencing. A dense germination of native plants should exclude weeds from establishing, however weed management will still be required.
Crossings	Existing bridge crossing in good condition
Stock watering	Stock have access to soaks and troughs off-stream and do not need to access the watercourse for drinking water.
Special features	Vegetation along this section of watercourse maintains the continuous corridor of riparian vegetation which links nearby reserves with bush in the northern part of the catchment.

MANAGEMENT RECOMMENDATIONS for Tim Bratby and Helen Annice

1. Fence the creekline to exclude stock during 2001 (as proposed).
2. Locate weeds and carry out control prior to regrowth of the native understorey.
3. Lay cut branches of teatree on denuded banks to encourage seeding and germination.
4. Native understorey species can be planted where natural regrowth doesn't occur.
5. Ongoing management and removal of taylorina, sweet pittisporum, blackberry and other environmental weeds within the fenced riparian zone is required.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for

Caroline Caddy

Location number: 2782
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: August 2000

Caroline has owned the property for two years and she highly values the riparian vegetation along her watercourse for wildlife habitat, nutrient stripping function and aesthetic value.

ISSUES	COMMENTS
Fencing	Unfenced at time of survey. Since then Caroline successfully applied for a waterways protection grant from the Torbay Catchment Group. Riparian vegetation on the northern bank will be fenced to exclude stock in 2001. The southern foreshore will remain unfenced as stock do not access this area.
Soil and banks	Sandy soils with high level of organic matter. Well vegetated stable banks and channel. Muddy track adjacent to stream crossing needs rock paving to prevent sediment and nutrient movement into the fresh watercourse. Overflow drain connecting wetland to watercourse could be a source of sediment and nutrients if it remains unvegetated.
Vegetation	The native riparian vegetation appears healthy and consists of dense, impenetrable tea-tree thickets. Bracken growing adjacent to the crossing track occurs is the first native plant to recolonise disturbed areas. Other native plants will eventually replace it therefore removal is not necessary.
Foreshore condition	A3 Grade*. Native vegetation dominates but there are some areas of human disturbance where weeds occur and where soil is exposed on the track leading to the creek crossing.
Weeds	The small taylorina infestation requires immediate control to prevent further spread. **O**ther weeds including arum lily have established from upstream properties, however the dense riparian vegetation made access and observation difficult. Native species will quickly recolonise once the taylorina is removed. Young taylorina plants including future germinants can be handpulled when the plants reach approximately knee high.
Crossings	Well-constructed bridge crossing over watercourse. Allows unrestricted flow during normal flows. Side stormwater pipes cater for overflow during high flow storm events.
Stock watering	There is no water supply in the northern paddock for stock that will be agisted there. Suggest installation of paddock troughs ie off-stream water supply so that cattle do not have direct access to watercourse, where they will cause degradation of the vegetation and banks through trampling.
Special features	• Tributary flows year-round with fresh water. • Recently constructed wetland adjacent to riparian vegetation is being vegetated with local native species and will provide additional valuable fauna habitat. An overflow drain connects the wetland to Marbellup Brook.

MANAGEMENT RECOMMENDATIONS for CAROLINE CADDY

1. Cut down large taylorina plants and paint cut stem with appropriate herbicide.
2. Hand pull any further germinations of taylorina when seedlings reach knee high.
3. Fence northern bank to exclude stock from riparian vegetation during 2001.
4. Install off-stream paddock trough in northern paddock.
5. Rock pave the track adjacent to the crossing to stabilise the soil.
6. Establish local sedges / rush species in the constructed wetland and overflow drain, to trap sediment and nutrients, and ensure high water quality flows into Marbellup Brook.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS

for Carl and Jo Plug

Location number: **5224**
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: August 2000

Carl has constructed a soak that provides an off stream stock water supply and keeps the cattle from trampling the riparian vegetation along the watercourse. A temporary electric tape had been erected along the native vegetation to keep stock away from the watercourse.

ISSUES	COMMENTS
Fencing	North bank of watercourse unfenced. South bank is boundary fenced. The Torbay Catchment Group has funds available to fence and protect waterways in the catchment. A vegetative buffer strip of 15 metres is recommended, wide enough for efficient nutrient uptake and to protect native vegetation.
Soil and banks	The stream is a small, narrow channel within a broad shallow valley. Dense vegetation in good condition along both banks. However the natural drainage channel has been dug out in the past year, with the intention of increasing channel flow and decreasing waterlogging of the adjacent pasture. This did not work as effectively as desired. This work has been done on many properties throughout the catchment but is not recommended as it has significant detrimental downstream effects. *Downstream problems* Drainage works within the natural waterway results in large quantities of sediment being shifted and washed downstream. When deposited, the sediment fills up natural pools (which previously provided valuable native fish habitat) and clogs the stream channels. Localised flooding then occurs where the channels have filled with sediment. Large quantities of nutrients are also transported attached to the soil particles, which ends up in Lake Powell and Torbay Inlet at the bottom of the catchment. As a result of these high nutrient levels, these waterbodies suffer from regular toxic blue-green algal blooms.
Vegetation	An area of riparian vegetation had been subjected to a hot burn prior to the foreshore survey, so it was not possible to accurately determine the condition of the vegetation in this area. Teatree thickets dominate. Albany bottlebrush occurs. Native vegetation and weed species (eg taylorina) have regenerated the disturbed areas following drainage work.
Foreshore Condition	B Grade*. Dense infestations of taylorina dominate some sections of the foreshore. In other areas, native species are dominant, although some replacement of natives by weeds (blackberry and taylorina) has occurred.
Weeds	Taylorina dominates the riparian zone in some sections. These would have established from upstream infestations. A blackberry infestation occurs in the creekline adjacent to western boundary fence on North Marbelup Road. Blackberry is a Declared Plant.

FORESHORE CONDITION REPORT for CARL & JO PLUG continued

Fire management	The foreshore vegetation and surrounding woodland was recently burnt for the first time in twenty years to reduce fuel loads and snake habitat. Fire disturbance creates ideal conditions for environmental weed and feral animal invasions.
Stock watering	Dam provides sufficient stock watering, which reduces the need for stock to access the watercourse. Trampling of the riparian vegetation by stock is therefore minimal even though the watercourse is unfenced.

MANAGEMENT RECOMMENDATIONS

1. Fence north bank of stream to permanently exclude stock from entire watercourse, in conjunction with existing south bank boundary fence.

2. Place fence at least 10 metres from stream channel to include and protect the existing buffer of native vegetation.

3. Fire management - when uncontrolled and on too frequent a basis, fire may leave bare areas of soil which leads to increased erosion, encourages weed and feral animal invasion, loss of habitat and damage to rehabilitation works.

4. ***Taylorina control***. Working from the upstream end, select a manageable area to eradicate each year. *Control:* Mature plants can be lopped at ground level and seedlings pulled by hand. Leave the lopped limbs to smother subsequent germinations of taylorina. **Or** spray with 1g Brushoff® or 100 mL Roundup® plus 25mL Pulse® per 10 litres of water. Follow up treatment every two years.

5. ***Blackberry control***. Blackberry is a serious creekline weed and it is a Declared Plant, and as such it is a requirement by law to eradicate it from your property. Blackberry is spread by birds and flowing water, therefore reinfestation is continuous and control is ongoing. *Control:* Cut off or burn growth then dig up roots or paint stumps with Brushoff® (or 100 mL Roundup®) plus 25mL Pulse® per 10 litres of water when actively growing.

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If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Mrs Gerarda Roth

Location number: 6627
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: October 2000

Mrs Roth highly values the creek and riparian habitat, which contains dense native vegetation in very good condition. Native fauna is present in abundance, including frogs, turtles and aquatic birdlife. The tributary flows continuously throughout the year.

The landowner recognises that cattle trampling has started to impact on the riparian zone, and plans to fence and protect the area whilst it is still in good condition. Successful application has been made to the Torbay Catchment Group for waterways funding.

ISSUES	COMMENTS
Fencing	***Main tributary (2.5 kilometres)*** South bank unfenced but stock have not accessed this stream bank. North bank is partially fenced (approx. 50%). This is a high maintenance fenceline due to ongoing kangaroo damage. The landowner intends to fence and exclude stock from the entire length of this tributary, including riparian vegetation, within the property. Application has been made to the Torbay Catchment Group for funding assistance. ***Minor tributary north west boundary (500 metres)*** West bank is fenced by boundary fence. East bank is unfenced and stock have unlimited stream access.
Soil and banks	***Main tributary*** Stable soil and banks due to the wide buffer (5 metres increasing to more than 50 metres wide along some sections) of undisturbed native vegetation (both stream banks). Localised erosion and trampling of the stream bank occurs at the main crossing area where stock have unlimited access. ***Minor tributary north west boundary*** Banks exposed, with areas of bare ground. *Foreshore condition is C3 grade*,* with eroded banks subsiding into stream channel. Banks are unsupported due to absence of root systems.
Vegetation	***Main tributary*** *Foreshore condition is A3 grade*.* The foreshore vegetation is healthy native bush (similar to that which you would see in most nature reserves, state forests and national parks). Dense tea tree thickets dominate. There are two areas of disturbance, a disused stock crossing which is revegetating with native species. Native vegetation trampled at the main stock crossing will quickly recolonise when fenced to exclude stock. ***Minor tributary north west boundary*** Vegetation is C1 grade, consisting of trees and large shrubs. Few understorey plants, bare soil and patchy coverage of pasture plants.
Weeds	Weeds are actively managed on the property and therefore no obvious infestations of problem weeds.

FORESHORE CONDITION REPORT for Mrs Gerarda Roth continued

Crossings	***Main tributary*** One dis-used crossover which is revegetating with native vegetation. The main crossing has deteriorated and no longer caters for heavy traffic. Mrs Roth has applied for Torbay Catchment Group funds to fence the crossover and exclude cattle from the riparian zone. Repair and upgrading of the crossing is also intended. ***Tributary north west boundary*** - Crossing not required
Stock watering	Soak dug out adjacent to riparian vegetation on north bank of main tributary supplies year-round stock water supply. Soak is fenced around bank to prevent cattle access to riparian vegetation.

MANAGEMENT RECOMMENDATIONS

Main tributary *(actions proposed by landowner)*

- Fence watercourse and riparian (waterway) vegetation to permanently exclude stock.
- Repair and upgrade existing crossing in use.
- Fence adjacent to crossing, to exclude stock access at this location.
- No revegetation required as riparian vegetation is in very good condition.

Minor tributary north west boundary.

- Fence to exclude stock, leaving a buffer width of at least 10 metres from the stream.
- Weed control is required to ensure regenerating native vegetation can out-compete.
- If native understorey species do not germinate and recolonise, it will be necessary to revegetate and stabilise the banks with direct seeding or planting of native seedlings.

Following the Marbelup Brook foreshore condition survey, these management recommendations are provided individually for each landowner taking part in the survey.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbelup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

*The foreshore condition assessment method used in this survey is described in the Water & Rivers Commission Report No. RR3, October 1999 *"River Restoration: Planning and Management: Foreshore condition assessment in farming areas of south-west Western Australia"*.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Mr Brian Attwell

Location number: **1232**
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: August 2000

The foreshore vegetation along Marbelup Brook on Brian's property is generally in good condition. Importantly it forms part of a continuous native vegetation corridor from Redmond at the top of Marbelup catchment to Lake Powell. The length of the corridor and good quality of vegetation within it significantly increases its habitat and biodiversity value.

FORESHORE CONDITION REPORT

ISSUES	COMMENTS
Fencing	Paddock containing Marbelup Brook has a permanent stock proof fence. The property is presently unstocked. If the paddock were restocked, fencing to protect the riparian vegetation along Marbelup Brook would be recommended.
Soil and banks	Stable soil and banks due to the excellent buffer of riparian vegetation covering both stream banks. Potential erosion point where firebreak graded down hill to bank of Marbelup Brook, adjacent to northern boundary fence. Foreshore vegetation has been removed from the west bank of Marbelup Brook, and firebreak continues to the water's edge. The watercourse has been widened at this point to form a large pool. Algal bloom present in the water at the time of survey. *Erosion and Nutrient Input Risk* The potential exists for the firebreak to severely erode and form a deep gully as a result of heavy rainfall events. The eroded material would be deposited directly into Marbelup Brook at the bottom of the hill. Large quantities of soil entering the brook would eventually fill the pool, block stream flow and caused localised flooding. Nutrients entering Marbelup Brook attached to the soil particles and dissolved in surface runoff can fuel algal blooms in pools along the brook and in waterbodies at the bottom of the catchment.
Channel form	Meander bends, pools and log riffles present. Channel form has not been modified (except at firebreak), and provides excellent examples of natural stream features.
Vegetation	Appears healthy and in good condition. Tree seedlings, saplings present. Riparian (waterway) vegetation is continuous with native vegetation east of Marbelup Brook on Brian's property. The riparian corridor forms an important part of the bush corridor and habitat continuous with the Westrail reserve and bush on adjacent properties.
Foreshore condition	B1 Grade*. Native species are dominant, although a few have been replaced by weeds.
Weeds	Taylorina, inkweed, blackberry, sweet pittosporum (fig), watsonia, Sydney Golden Wattle and *Isolepis prolifera* present. Weeds are a problem but it is more important that the banks are stable and vegetated. Kikuyu has replaced native vegetation at stream crossing.

FORESHORE CONDITION REPORT for Mr Brian Attwell **continued**

Crossings	Stream bed crossing is stable and rock paved.
Stock watering	Dams are provided for stock watering. No need for stock to access stream banks.
Adjacent landuse	Bracken regrowth over floodway pasture. This area previously used to grow horticultural crops. The property is used for sand and gravel extraction.

MANAGEMENT RECOMMENDATIONS

1. Revegetate bank where firebreak intersects Marbelup Brook to prevent erosion.

2. Weed control required. Tackle a manageable section each year starting from upstream (north) boundary. Care must be taken to ensure that existing native vegetation and stable soil and banks are not disturbed. The foreshore condition report provides advice on management for the various weeds.

3. Fencing of the riparian (waterways) vegetation adjacent to Marbelup Brook is recommended if the adjacent pasture is restocked in the future.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Ross and Anne Wallrodt

Location number: 1389
Survey Method: On-ground assessment with landowner
Catchment location: Upper Torbay Catchment
Survey conducted: August 2000

The riparian corridor on Ross and Anne Wallrodt's property forms an important part of the bush corridor and habitat continuous with the Westrail reserve and adjacent properties. Ross is to be congratulated as the fenced native vegetation on his property is one of the few areas of A2 Grade foreshore condition in the Marbelup Brook Catchment.

ISSUES	COMMENTS
Fencing	At the site visit, 50% of the waterway vegetation (riparian vegetation) was fenced. Ross was considering fencing the remaining section.
Vegetation	**Fenced section** The vegetation along the waterway (riparian vegetation) appears healthy and in good condition. Dense understorey of native plant species. The riparian vegetation is continuous with native vegetation east of Marbelup Brook on Ross's property. **Unfenced section** Varies – see foreshore condition below. Some areas where native vegetation is intact and in good condition, to areas where pasture species dominate the understorey. Here, isolated clumps of sedge / rushes remain. Large numbers of good-sized *melaleucas* remain.
Foreshore condition	**Fenced section** *A2 grade – Near Pristine.* Native vegetation is dominant. Some introduced weeds may be present in the understorey, but not to the extent that native species are displaced. No other evidence of human impact. A valley in this condition is as good as will be found today. **Unfenced section -** *Varies from A3 to C1 grade.* *A3 grade.* This area is adjacent to that protected by fencing and has not been trampled by stock. Native vegetation is dominant. There are some areas of disturbance where the soil is exposed and weeds are relatively dense eg. stream crossings and along tracks. Native vegetation would quickly recolonise if human / stock disturbance declined. *C1 grade* where cattle have had greater access (section adjacent to northern boundary fence). Trees remain, however little evidence of regeneration - no seedlings or saplings present. Isolated clumps of sedges / rushes remain. The understorey has largely been replaced by pasture, which provides no support to the soil along stream banks. A small increase in physical disturbance will expose the soil and watercourse vulnerable to erosion.
Weeds	Weed infestions limited to: Watsonia - isolated patch of in the paddock adjacent to the fenced area of foreshore vegetation. Blackberry - isolated patch easy to control at the present small scale of infestation.

FORESHORE CONDITION REPORT Ross and Anne Wallrodt **continued**

Soil and banks	Stable soil and banks along *A Grade* sections of the watercourse (see below), due to the good buffer of riparian vegetation covering both stream banks. However, cattle access and trampling is evident along the section of watercourse adjacent to the northern boundary fence. The soil surface and banks along this section, although covered with pasture at the time of survey, would be erosion prone with cattle access during summer months.
Crossings	No formal crossing point.
Stock watering	Stock have access to off-stream watering points.
Adjacent landuse	Pasture – cattle grazing.

MANAGEMENT RECOMMENDATIONS

Unfenced section - A3 Grade vegetation

- Fence the watercourse to protect existing native vegetation along from stock.
- Include large isolated paper bark trees within protective fencing if possible.
- Construct a rock-paved stock crossing over the stream to minimise erosion.
- No revegetation is required as the vegetation is in very good condition.
- Control weed infestations as outbreaks occur (eg watsonia, blackberry, taylorina).

Unfenced section – parkland-cleared adjacent to northern boundary fence (paperbarks with pasture understorey)

- Fence to exclude stock, leaving a buffer width of at least 10 metres from the stream.
- Weed control is required to ensure regenerating native vegetation can out-compete.
- If native understorey species do not germinate and recolonise, it will be necessary to revegetate and stabilise the banks with direct seeding or planting of native seedlings.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for Kevin and Michelle McAlpine

Location number: Lot 5 Norton Road
Survey Method: On-ground assessment with landowner
Catchment location: Wildflower subdivision, Upper Torbay Catchment
Survey conducted: September 2000

Kevin and Michelle's property is part of a wildflower subdivision. The original location had been largely cleared 15-20 years and stocked for 10 years. The sub-division is now extremely well vegetated with local native vegetation in excellent condition. Frogs are abundant, with at least 10 species identified. The watercourse flows throughout the year.

ISSUES	COMMENTS
Fencing	Not required.
Soil and banks	Stable soil and banks due to the good buffer of riparian vegetation covering both stream banks. The vehicle crossing is a localised area of exposed soil.
Vegetation	Excellent regrowth of native species – little evidence of previous clearing disturbance. Understorey vegetation is extremely dense, leaving the stream channel largely inaccessible. The vegetation community structure of this regrowth is likely to be different from that of the original structure.
Foreshore condition	*A3 Grade* – the foreshore has healthy native bush, similar to that which you would see in most nature reserves. Native vegetation dominates.
Weeds	Weed invasion is limited to localised taylorina infestations and some introduced grass and rush *(microcephalis sp.)* infestations at stream crossing points.
Crossings	Informal creek crossing

MANAGEMENT RECOMMENDATIONS

- Construct a rock-paved vehicle crossing to stabilise exposed soil and reduce downstream soil transport. Source rocks locally to minimise dieback spread.
- If local supply is unavailable, leave crossing as is rather than risk dieback introduction.
- Control taylorina infestations as outbreaks occur. Mature plants can be lopped at ground level and seedlings pulled by hand.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS

for *Peter Royce*

SURVEY DETAILS	COMMENTS
Location: Lot 1 Norton Road Wildflower subdivision, upper Torbay catchment.	**Vegetation and Foreshore condition** Meander bend of watercourse is in back south-east corner of block. The original location had been largely cleared 15-20 years and stocked for 10 years. The sub-division is now extremely well vegetated with local native vegetation in excellent condition. Assessed as A3 grade based on aerial photograph interpretation. Pristine waterways vegetation on adjacent blocks also. Zoning requires these lots to remain uncleared bush blocks. **RECOMMENDATION:** Maintain current management practices for waterways protection.
Survey conducted September 2000	
Survey method: Aerial photo	

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FOREHORE CONDITION SURVEY AND MANAGEMENT RECOMMENDATIONS *for Ruth Jahn*

<table>
<tr><th>SURVEY DETAILS</th><th>COMMENTS</th></tr>
<tr><td>Location:
Lot 4 Norton Road Wildflower subdivision, Torbay upper catchment.</td><td rowspan="3">Fencing:
Not stocked therefore foreshore fencing not required.

Foreshore Condition
The original location had been largely cleared 15-20 years and stocked for 10 years. The sub-division is now well vegetated with local native vegetation in good condition. B1 Grade.

RECCOMENDATION:
Maintain current management practices for waterways protection.</td></tr>
<tr><td>Survey conducted:
October 2000</td></tr>
<tr><td>Survey method:
On-site assessment.</td></tr>
</table>

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION SURVEY AND MANAGEMENT RECOMMENDATIONS for *Down Road South Reserve - Department of Conservation.*

SURVEY DETAILS	COMMENTS
Location: 7388 Upper catchment **Survey conducted: September 2000** **Survey method:** Aerial photo. Not possible to access the watercourse as access tracks are closed off.	**Vegetation and Foreshore Condition** Aerial photograph assessment at A3 grade - slightly disturbed. Typically, native vegetation dominates but there are some areas of human disturbance where soil may be exposed and weeds are relatively dense (such as along tracks). The native vegetation would quickly recolonise the disturbed areas if human activity declined. **Environmental Weed Infestation** Not possible to determine level of weed infestation, however some would be expected. **RECOMMENDATIONS:** • Map existing infestations of environmental weeds. • Control any environmental weed infestations.

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FORESHORE CONDITION SURVEY AND MANAGEMENT RECOMMENDATIONS for *Location 7239*

SURVEY DETAILS	COMMENTS
Location: 7239 Upper catchment **Survey conducted:** September 2000 **Survey method:** Observed from adjacent property.	**Fencing Status** This section has been completely fenced to exclude stock. Fencing was encouraged by the adjacent landowner to reduce stock losses in boggy areas as well as protecting the watercourse from degradation by stock. **Foreshore and Vegetation Condition** Riparian vegetation is intact and appears healthy. A2-A3 Grade foreshore condition, where native vegetation dominates. Some introduced weeds may be present but not to the extent that native species are displaced. Otherwise there is no evidence of human impact. A river valley in this form is as good as will be found today. Some areas of human disturbance where soil may be exposed and weeds are relatively dense (such as along tracks). The native vegetation would quickly recolonise the disturbed areas if human activity declined. **RECOMMENDATIONS:** • Ongoing maintenance of watercourse fencing. • Ongoing checks and eradication of common weed infestations as they occur eg taylorina, blackberry, arum lily, watsonia, Sydney Golden Wattle.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION SURVEY AND MANAGEMENT RECOMMENDATIONS for *Ross Attwell*

SURVEY DETAILS	COMMENTS
Location: Plant. 6620 Upper catchment **Survey conducted: October 2000** **Survey method:** On-site assessment.	*Vegetation and Foreshore Condition* The property is planted to bluegum plantation. Not stocked. No areas of active erosion or subsidence. Largely surface flows, not defined channel flow. Foreshore condition over these swales is B Grade, with pasture plants a significant component of the understorey vegetation. Although native species are dominant, weeds would have replaced a number of species. **RECOMMENDATION:** Fencing of the watercourse / swale is recommended only if the areas currently under plantation are to be restocked.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FOREHORE SURVEY AND MANAGEMENT RECOMMENDATIONS:
for Derek Tombleson

SURVEY DETAILS	COMMENTS
Location: Plant. 7295 Upper catchment	**Vegetation and Foreshore Condition** Grass swale. Prior to clearing this area was vegetated with dense tea tree thickets (Derek Tombleson pers. comm.). B Grade foreshore condition – pasture plants are as abundant as native species. Some tea tree and sedges remain along the swale, however the regeneration of these species has declined. No defined channel. No erosion sites visible. **RECOMMENDATIONS:** Maintain existing native vegetation and pasture coverage of swale. If areas of bare soil, erosion and channel formation occur, consider fencing and revegetating the swale with local native species to stablise the soil.
Survey method: Aerial photograph interpretation. Phone discussion with land-owner. Roadside observation.	

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION SURVEY AND MANAGEMENT RECOMMENDATIONS

for *Allen Watterson*

The main channel of Marbelup Brook follows the eastern boundary of Allen's property, which abuts the Westrail reserve. The valley is fenced to exclude stock. It has excellent coverage of dense, impenetrable riparian vegetation, continuous with that in the Westrail reserve.

SURVEY DETAILS	COMMENTS
Location: Plant. 4119 Upper catchment **Survey method:** On-ground assessment with landowner. **Survey Date:** October 2000	**Fencing** Marbellup Brook is completely fenced to keep stock out because they get stuck, lost or drowned in the dense riparian vegetation and bog holes. *Soil and banks* Stable soil and banks due to good coverage of riparian vegetation. **Stock Watering** Dams and soaks are located off-stream, within paddocks. **Vegetation and Foreshore Condition** Vegetation is A2 grade, with native vegetation dominant and little evidence of human disturbance. A river valley in this condition is as good as will be found today. **Weeds** None observed in drive past viewing of riparian vegetation. Some introduced weeds may be present in the understorey, but not to the extent where they displace native species. **Special Features** Good linkage to adjacent bush reserves. Dense riparian vegetation in good condition provides excellent linkage to bush habitat in adjacent Marbelup Nature Reserve, Westrail reserve and City of Albany gravel reserves. **RECOMMENDATIONS:** • Continue current good management practices that protect the waterway and associated vegetation. • Maintain stock proof fence along watercourse. • Check for new environmental weed infestations. • Eradicate environmental weeds as they occur.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Enid Mead*

Enid's property contains the main channel of Marbelup Brook along the eastern boundary. This abuts the Westrail reserve. The eastern bank of Marbelup Brook is vegetated with dense, impenetrable riparian vegetation, continuous with the densely vegetated Westrail reserve.

SURVEY DETAILS	COMMENTS
Location: Plant. 745 Upper catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** Presently unfenced. Cattle access streambed. Enid has made successful application to the Torbay Catchment Group for funds to fence the western bank of Marbelup Brook on her property. *Soil and banks* Localised areas of bare soil and unstable eroding banks where stock habitually access and trample. The steep banks and sandy profile the bank slumping and erosion. *Stock Crossing* Not required – no access required to eastern bank. Dense bush. **Stock Watering** Cattle drippers are located in the paddocks so drinking water access to Marbelup Brook is not necessary. **Vegetation and Foreshore Condition - eastern bank:** Native species dominate the eastern bank (B1 Grade), however there are some areas of stock disturbance where the soil is exposed and pasture plants are relatively dense. The native vegetation would quickly recolonise the disturbed areas once stock are excluded. Eastwards away from the channel, the native vegetation is dense, impenetrable and would have minimal weed infestation (A3 Grade vegetation). **Vegetation and Foreshore condition - western bank:** C3 Grade areas where soil is exposed with cattle trampling. Soil is washed away from between tree roots, trees are being undermined and unsupported embankments are subsiding into the channel. Other sections along the western bank are stable B Grade condition, with native vegetation remaining. In the understorey, pasture plants are about as abundant as native species or dominant in parts. **Weeds** No noticeable weeds in the riparian vegetation. However Taylorina on the banks of the paddock soak could progress to the riparian zone. Taylorina is difficult to eradicate once established in bush areas particularly as it is a prolific seeder. Viable seed remains dormant in the soil for 10 years or more.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Enid Mead* continued

SURVEY DETAILS	*COMMENTS*
From previous page	**Special Features** Good linkage to adjacent bush reserves**.** Dense riparian vegetation in good condition provides excellent linkage to bush habitat in adjacent Marbelup Nature Reserve, Westrail reserve and City of Albany gravel reserves. **RECOMMENDATIONS:** • Erect stock proof fence along watercourse utilising Torbay Catchment Group funds. • Remove taylorina around soak – mature plants can be lopped at ground level and seedlings pulled by hand. • Check annually for Taylorina germination and remove. • Check for other environmental weed infestations eg. watsonia, Sydney Golden Wattle, blackberry, pittosporum. • Eradicate these environmental weeds as they occur.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Don McEachern*

Don's property contains the main channel of Marbelup Brook along the eastern boundary. This abuts the Westrail reserve. The eastern bank of Marbelup Brook is vegetated with dense, impenetrable riparian vegetation, continuous with the densely vegetated Westrail reserve.

SURVEY DETAILS	COMMENTS
Location: Lot 1 Upper catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** Presently unfenced. Stock access the bush particularly during summer months. *Soil and banks* Dense native vegetation protects the soil and banks. *Stock Crossing* Not required – no access required to eastern bank. Dense bush. **Stock Watering** Off-stream soak provides stock water. Stock access to Marbelup Brook particularly during summer. **Vegetation and Foreshore Condition - eastern bank:** Native species dominate the eastern bank. B1 Grade where stock have access. Stock trampled areas where soil is exposed and pasture plants have colonised, would quickly revegetate with native species once stock are excluded. Eastwards away from the channel, the native vegetation is dense, impenetrable and would have minimal weed infestation (A3 Grade vegetation). **Vegetation and Foreshore condition - western bank:** The western bank is in stable B Grade condition around the edges, with native vegetation dominant. Stock trampled areas where soil is exposed and pasture plants have colonised would quickly revegetate with native species once stock are excluded. Dense, impenetrable A3 Grade vegetation past stock access. **Weeds** Some blackberry. **Fauna** Don notes that marron have been in the creek every year for the 8 years he has been on the property, however has seen none this year (2001). The prescence or absence of marron and other invertebrates are valuable indicators of stream health, and it would be of concern if marron have permanently disappeared.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Don McEachern* continued

SURVEY DETAILS	*COMMENTS*
	Special Features Good linkage to adjacent bush reserves**.** Dense riparian vegetation in good condition provides excellent linkage to bush habitat in adjacent Marbelup Nature Reserve, Westrail reserve and City of Albany gravel reserves. **RECOMMENDATIONS:** • Erect stock proof fence along watercourse utilising Torbay Catchment Group funds. • Remove blackberry infestations. Check for other environmental weed infestations eg. taylorina, watsonia, Sydney Golden Wattle, blackberry, pittosporum which can spread from upstream and birds carrying fruit of these plants. Eradicate environmental weeds as they occur.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Barry and Leslie Goodchild*

Barry and Leslie have owned this property for 14 years. They place high value on their waterway vegetation for the wildlife habitat, nutrient stripping function and aesthetic value. The owners are concerned about the upstream impacts on this waterway including cleared of riparian vegetation and nutrient inputs from the nearby piggery and fertiliser application. Barry has encouraged neighbouring landowners to fence and protect foreshore areas. Barry and Leslie are to be congratulated for the care they have taken of the watercourse and native vegetation on their property, which has contributed to the overall good condition of the waterways in this catchment.

SURVEY DETAILS	COMMENTS
Location: Lot 1 Upper catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** Partly fenced. Further fencing is required to exclude stock from waterway vegetation. Along some sections, the vegetation structure is dense enough (teatree, sedges / rushes) to exclude stock. Along other sections, stock have begun to impact on the integrity of the native vegetation. *Soil and banks* Soil and banks are well protected due to the dense coverage of native vegetation along the watercourse. *Stock Crossing* One stable stock crossing provides access to the farm area separated from the larger portion of the property by the watercourse **Stock Watering** Off-stream soak provides stock water. Several small soaks have been pushed out along the perimeter of the foreshore vegetation, to provide water rather than stock having to access the creek. This is working well with minimal intrusion of stock into native vegetation in search of water. Soaks are butted up against foreshore vegetation but are placed well away from the stream channel. **Vegetation and Foreshore Condition:** Generally in good condition, A3 Grade. Some sections B3 grade where dense thickets of taylorina occur and areas of stock trampling. **Weeds** Taylorina has spread extensively along the waterway. This was previously under control however during absence from the property this has regrown in dense thickets. An isolated kangaroo apple paddock tree. This plant does not appear to be highly invasive. **Fertiliser Regime** Barry has not applied fertiliser to pasture for some years due to concerns with nutrient runoff into waterways.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Barry and Leslie Goodchild* continued

SURVEY DETAILS	*COMMENTS*
	Bush Connectivity and Corridors The Goodchilds have enhanced the value of native vegetation on their property and in the catchment by linking the native riparian vegetation and other bush remnants on their property to adjacent bush reserves via vegetation corridors and buffers**.** These form part of a continuous vegetation corridor throughout the catchment, linkage bush habitat in Marbelup Nature Reserve, the Westrail reserve and City of Albany gravel reserves. A bush block on the property, previously eucalypt woodland with parkland clearing, has since been scarified and fenced. The remnant bush now has dense understorey vegetation with no weed species visible. *Fauna* Birds and frogs are prevalent. Since the bush corridor between the waterway (north boundary) has been revegetated to connect with the reserve (south boundary), Barry and Leslie have observed an increase in bird numbers to the property. **<u>Landowner Comments:</u>** **Fire Management** Concern that the practice of burning to reduce understorey and fuel loads is widespread, and that this is an unnecessary practice. Aboriginal people carried out burns in the calm of an evening prior to heavy dew, so that fire wasn't too widespread or hot. The fire crept outwards from the tree and gave wildlife the opportunity to escape. Burning of bushland removes native understorey grasses – parrots don't have access to their food supply so look elsewhere. **Impact of Landuses on Waterways** • Observation has been made that since clearing of the riparian (waterway) vegetation on the property to the south of this survey location, the foreshore area on this property (northern bank) is much wetter / waterlogged. • Concern regarding nutrient rich runoff from neighbouring piggery into Marbelup Brook along railway line tributary.

FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS for *Barry and Leslie Goodchild* continued

SURVEY DETAILS	*COMMENTS*

RECOMMENDATIONS:

- Erect stock proof fence along remaining unfenced sections of watercourse utilising Torbay Catchment Group funds.

- ***Taylorina control***. Working from the upstream end, select a manageable area to eradicate each year. *Control:* Mature plants can be lopped at ground level and seedlings pulled by hand. Leave the lopped limbs to smother subsequent germination of taylorina. **Or** spray with 1g Brushoff® or 100 mL Roundup® plus 25mL Pulse® per 10 litres of water. Follow up treatment every two years.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT RECOMMENDATIONS *for Lindsay Black*

Lindsay places high value on his native vegetation remnants. He leases adjacent pastoral properties and took some time to show me the extent of waterways throughout these properties. This provided an overview of the vegetation types and condition of waterways over a large area of Marbelup catchment that would otherwise not have been possible.
Note: This report is for Lot 1 only and does not include the additional leases.

SURVEY DETAILS	COMMENTS
Location: Lot 1 Upper catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** ***Majority unfenced.*** *Soil and banks* More than half of the tributary on this property is pasture swale ie a shallow depression stabilised with pasture and no defined channel. Downstream of the swale is a short section (50 m) of sedges, also with no defined channel. This section is trampled by stock. The remaining section is vegetated with dense native vegetation protecting the soil and banks from erosion. No erosion points visible from vehicle inspection. *Stock Crossing* No existing stock crossing. A crossing would be necessary if the entire length of watercourse on this property were fenced, so that stock can access pasture in south west corner of property without impacting on native vegetation. **Stock Watering** Off-stream soak provides stock water. This reduces the need for stock to access Marbelup Brook, which in turn protects the banks and riparian vegetation from damage by trampling. **Vegetation and Foreshore Condition** The riparian (waterway) vegetation on this property is in good condition, B1 Grade, as viewed from the vehicle. Some areas are disturbance from stock trampling however native vegetation would quickly recolonise these areas if stock were fenced out. **Special Features** The riparian (waterway) vegetation in good condition on this property provides habitat diversity, which adds to that in the adjacent Down Road South Nature Reserve.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Lindsay Black* **continued**

RECOMMENDATIONS:

- Erect stock proof fence along watercourse.
- Construct vehicle / stock crossing to access pasture in south west corner of property
- Utilise Torbay Catchment Group funds to assist with above recommendations.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Sydney Old*

At least one third of this property is covered with native remnant vegetation in pristine condition. The value of this vegetation is greatly enhanced by its connectivity with the pristine vegetation, including riparian (waterways) vegetation, in adjacent landholdings. These areas form a significant and continuous vegetation corridor throughout the catchment, linking bush habitat in Marbelup Nature Reserve, the Westrail reserve and City of Albany gravel reserves. The large area of remnant vegetation in excellent condition on Syd's property has contributed to the overall good condition of waterways in Marbelup Catchment.

SURVEY DETAILS	COMMENTS
Location: 5780 Upper catchment **Survey Method:** Discussed survey with landowner by phone. On-site assessment with lessee (Lindsay Black). **Survey conducted**: September 2000	**Fencing** ***Majority unfenced.*** *Soil and banks* The headwaters of the tributary on this property is a swale, or depression which collects water but has no defined channel. The swale is vegetated with pasture and dense sedge / rush plants that stabilise the soil and help prevent erosion. Sedge plants carry out a valuable ecological function, capturing nutrients that would otherwise end up in downstream waterbodies. *Stock Crossing* None necessary. **Stock Watering** Soaks adjacent to the tributary provide stock water. These reduce the need for stock to access Marbelup Brook, which in turn protects the banks and riparian vegetation from damage by trampling. **Vegetation and Foreshore Condition** The riparian (waterway) vegetation on this property is in very good condition, A2 Grade (near pristine). Native vegetation dominates. The introduced weed *taylorina* is present but not to the extent that it displaces native species. There is otherwise no evidence of human impact. Stock access to the riparian vegetation has been limited due to the extremely dense nature of the riparian vegetation. The landowner believes that dead standing eucalypts at the top of the pasture swale may have died due to waterlogging. **Weeds** Some taylorina, currently confined to a small area and easy to control. Taylorina is invasive and displaces native vegetation, therefore early control is highly recommended. Inkweed and isolated kangaroo apple on higher ground away from watercourse. **Special Features** It is rare to find riparian (waterway) vegetation and bush remnants in such good condition, either in public or private ownership. Pristine condition and excellent connectivity to the Marbelup Brook riparian corridor.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Sydney Old* **continued**

RECOMMENDATIONS:

- Erect stock proof fence along watercourse and adjacent upland bush remnants utilising Torbay Catchment Group funds.

- ***Taylorina control***. Working from the upstream end, select a manageable area to eradicate each year. *Control:* Mature plants can be lopped at ground level and seedlings pulled by hand. Leave the lopped limbs to smother subsequent germination of taylorina. **Or** spray with 1g Brushoff® or 100 mL Roundup® plus 25mL Pulse® per 10 litres of water. Follow up treatment every two years.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Ken Pech*

A pasture swale (depression) in the south east corner of the property collects significant quantities of surface water runoff, feeding it downstream. The pasture and sedge plants vegetating this headwater serve an important ecological function, capturing and utilising nutrients before they can enter downstream waterbodies. Good vegetation coverage also minimises erosion and soil transport. The north west corner of this property contains a small area of riparian (waterway) vegetation, part of the main the main channel of Marbelup Brook and adjacent to the Westrail rail reserve.

SURVEY DETAILS	COMMENTS
Location: 5777 Upper catchment **Survey Method:** On-site assessment with manager (Julian Blogg) **Survey conducted**: September 2000	**Fencing** ***Unfenced.*** *Soil and banks* The pasture swale (south east corner of the property) has no defined channel. Erosion is minimised, with good coverage of pasture and rush plants. *Stock Crossing* Not necessary. **Stock Watering** Soaks adjacent to the tributaries provide stock water. These reduce the need for stock to access Marbelup Brook, which in turn protects the banks and riparian vegetation from trampling damage. **Vegetation and Foreshore Condition** The riparian (waterway) vegetation in the north west of this property is in good condition, A3 Grade. Native vegetation dominates. Stock access to the riparian vegetation has been limited due to the extremely dense nature of the riparian vegetation and the adjacent soak. **Weeds** A Cumbungi (Bulrush, *Typha orientalis*) infestation is contained within the soak adjacent to Marbelup Brook. However cumbungi is an invasive introduced weed, which will displace native vegetation if not controlled. One spike (seed head) can produce 200,000 seeds with a high percentage of viability. Removal is recommended, to prevent infestation of the adjacent riparian vegetation, which at present is in good condition. **Special Features** Although this is a small area of riparian vegetation, it is in good condition and continuous with the Marbelup Brook riparian corridor.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Ken Pech* **continued**

RECOMMENDATIONS:

- Erect stock proof fence along riparian vegetation in the north west corner of the property.
- Erect stock proof fence around pasture swale / rush vegetation in south east of property.
- Utilise Torbay Catchment Group funds for riparian fencing.
- Control cumbungi using approved herbicides or cutting below water in autumn.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Geoff and Sandra Potts*

The headwaters on this property seep from an area of groundwater upwelling. Downstream, the property flattens out on the catchment floodplain. Artificial channels have been constructed to drain this area and include a series of connected ponds.

SURVEY DETAILS	COMMENTS
Location: 601 Lower catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing Status** Not fenced. **Soil and banks** Trampling of the natural watercourse and drain banks by cattle has resulted in areas where soil erosion has begun through the action of water. This stream erosion results in large quantities of soil and fine sediment being washed downstream. When deposited, the sediment fills up natural pools (which previously provided valuable native fish habitat) and clogs the stream channels. Localised flooding then occurs where the channels have filled with sediment. Large quantities of nutrients are also transported attached to the soil particles, which ends up in Lake Powell and Torbay Inlet at the bottom of the catchment. As a result of these high nutrient levels, these waterbodies suffer from regular toxic blue-green algal blooms. Fencing of watercourses to exclude stock will protect the catchment waterways from the effects of erosion. However fencing of all drainage channels on small properties is impractical for the landowner, as a significant proportion of pasture is lost. On this property, exclusion of stock from the main channel will greatly assist. **Stock Watering** Cattle have unlimited access to the stream and drains for water. **Vegetation and Foreshore Condition** A mixture of tall local native shrub and exotic weed species vegetate the watercourse. A limited variety of native species are present and include Swamp Cedar (*Agonis juniperina),* pale rush (*Juncus pallidus*) and other tea tree species. **Weeds and Management** Taylorina and blackberry infestations occur along the watercourse. The landowner pushes over taylorina however some plants continue to grow horizontally. Taylorina is an invasive weed that displaces native vegetation. *Fertiliser Regime* The landowner applies fertiliser at rate of 25 kg an acre.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Geoff and Sandra Potts* **continued**

RECOMMENDATIONS:

- Keep stock out of the main stream channel by erecting a stock proof fence utilising Torbay Catchment Group funds. This recommendation takes into account the impracticality of fencing all drains and watercourses on small properties.

- Allow stock watering from dam to prevent damage and erosion of stream banks.

- ***Taylorina control***. Working from the upstream end, select a manageable area to eradicate each year. *Control:* Mature plants can be lopped at ground level and seedlings pulled by hand. Leave the lopped limbs to smother subsequent germination of taylorina. **Or** spray with 1g Brushoff® or 100 mL Roundup® plus 25mL Pulse® per 10 litres of water. Follow up treatment every two years.

- Revegetate areas cleared of Taylorina, with suitable local native species. Advice on species selection and funding is available through Torbay Catchment Group funding.

- ***Blackberry control.*** This is a serious weed of waterways and is spread by birds. This means that reinfestation is continuous and ongoing control is necessary. Cut off or burn growth, then dig up roots or paint sumps with Brushoff® or Roundup®. Or spray whole plant with 1g Brushoff® (or 100 ml Roundup®) plus 25 mL Pulse® in 10 litres.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Shane Kuenen*

This property has been in the family for three generations. Shane's grandfather remembers when streamflow was seasonal, drying up during summer months. It has now changed to year round flows. The altered flow regime has enabled Shane to establish irrigated horticulture cropping adjacent to Marbelup Brook.

Shane has successfully applied for Torbay Catchment Group funds to fence the waterway, including native riparian vegetation, and to install a stock / vehicle crossing and offstream stock water access.

SURVEY DETAILS	COMMENTS
Location: 2449, 2450 Lower catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** ***Some sections fenced. Fencing of remaining sections, both sides of watercourse, is in progress utilising Torbay Catchment Group waterways rehabilitation grant.*** *Soil and banks* The eastern section of the watercourse is densely vegetated, which is preventing cattle access and protection the soil and banks from erosion. The remaining two thirds of watercourse (western section) has continuous cattle access. Soil is pugged by cattle trampling and banks are bare and eroding in places. However this area will be protected when fenced. *Stock Crossing* Good existing crossing. Construction of an additional crossing is to be funded by Torbay Catchment Group grant. **Stock Watering** Stock at present water directly from the watercourse. An off stream watering point will be installed with funding assistance. This will protect the stream banks from erosion. **Vegetation and Foreshore Condition** The eastern section of dense riparian (waterway) vegetation is in very good condition, on this property is in very good condition and partly fenced, A3 Grade. Native vegetation dominates. A small patch of introduced bulrush (*Typha orientalis*, cumbungi) occurs in this section. West of this section, the upstream extent of the watercourse is heavily grazed. Sedge plants are the remaining dominant understorey species. These plants have an important role in nutrient uptake from paddock runoff. Their roots stabilise the soil and banks along the watercourse. Large paperbarks (*Melaleuca*) in good condition grow along this section. The native vegetation, soil structure and banks of this watercourse will benefit from fencing and permanent stock exclusion. Native understorey species will rapidly regenerate once fenced.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIOS *for Shane Kuenen* **continued**

Weeds

Isolated watsonia, arum lily and blackberry plants occur along the watercourse and the landowner regularly eradicates these weeds. As they are spread from upstream properties and birds, reinfestation is continuous and control is ongoing.

A small area of introduced bulrush (Typha or cumbungi) is growing amongst the A3 grade vegetation. This invasive species will displace native vegetation if not controlled. One spike (seed head) can produce 200,000 seeds with a high percentage of viability. Removal is recommended, to prevent infestation of the adjacent riparian vegetation which at present is in good condition.

Special Features

The waterway vegetation on this property is extremely important, as it is continuous with the Marbelup Brook vegetation corridor that extends throughout the catchment and protects the watercourse.

RECOMMENDATIONS:

- Complete stock proof fenc along watercourse to protect riparian (waterway) vegetation from stock access, utilising Torbay Catchment Group funds grant.
- Complete stock / vehicle crossing and off stream stock watering as per grant application.
- Maintain existing successful weed control program for watsonia, arum lily and blackberry infestations.
- Control cumbungi using herbicides approved for use in waterways, or by cutting stems off below the water level in autumn.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

If you would like to discuss the above recommendations, or you would like to apply to the Torbay Catchment Group for funds to protect, fence and revegetate your section of Marbellup Brook, please contact Julie Pech at the Water and Rivers Commission on 9841 0125.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Tony Erith*

Previously a dairy farm, landuse on the property has since changed to beef cattle production and blue gum plantation.

SURVEY DETAILS	COMMENTS
Location: 6623 Upper catchment **Survey Method:** On-site assessment with landowner. **Survey conducted**: September 2000	**Fencing** ***Unfenced.*** *Soil and banks* Stock have unlimited access to the watercourse. Some bank erosion has occurred as a result of stock trampling. Slugs of white sand have been deposited from material eroded from further upstream. The landowner reports the channel width and depth is stable and has been unchanged for some time. **Drainage** A number of drains have been constructed to reduce waterlogging of the adjacent pasture. Sections of the natural watercourse have been dug out to increase water movement. Bluegums were planted on the upper hill slopes 3 years ago to intercept surface and groundwater flows, to reduce winter waterlogging of the pasture flats. *Stock Crossing* None. The location and positioning of constructed stock crossings has been discussed on two site visits. **Stock Watering** Adequate soaks and dams are in place and the stock have no need to access the watercourse to drink. This in turn protects the banks and riparian vegetation from damage by trampling. **Vegetation and Foreshore Condition** The native vegetation remaining along the eastern tributary consists largely of teatree and sedges. These plants have an important role in taking up nutrients from paddock runoff. Their roots stabilise the soil and banks along the watercourse. Taylorina and Sydney Golden Wattle occur along this section. B3 Grade – weed dominated but with many native species. The tributary in the southwest corner of the property has riparian vegetation in good condition. Dense understorey vegetation and large paperbarks (Melaleuca) appear healthy -B1 Grade.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Tony Erith* **continued**

RECOMMENDATIONS:

- Fencing of watercourses to exclude stock will protect the catchment's waterways from erosion. However fencing of all drainage channels on small properties is impractical for the landowner, as this is impractical for stock movement and a significant proportion of pasture is lost. On this property, exclusion of stock from the main tributaries in the south west and the eastern side of the block will greatly assist.

- Erect stock proof fence along main tributaries utilising Torbay Catchment Group funds.

- Install vehicle / stock crossing utilising Torbay Catchment Group funds.

- ***Taylorina control***. Working from the upstream end, select a manageable area to eradicate each year. *Control:* Mature plants can be lopped at ground level and seedlings pulled by hand. Leave the lopped limbs to smother subsequent germination of taylorina. **Or** spray with 1g Brushoff® or 100 mL Roundup® plus 25mL Pulse® per 10 litres of water. Follow up treatment every two years.

- ***Sydney Golden Wattle control.*** Spray (or paint) lower 50 cm of trunk with 100 mL of ACCESS per 5 litres of diesel and leave standing. This option is not labour intensive. **Or** cut and remove shrubs and trees, disposing of seeds. Hand pull seedlings or spray with 1 in 1000 Lontrel. Cut young plants at or just below ground level.

Following the Marbellup Brook foreshore condition survey, the management recommendations for individual properties have been provided as confidential advice to each landowner.

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FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Maurice and Sandra McCormick*

Sandra and Maurice McCormick value highly the bush and waterways on their property. This property is the boundary between the upper Torbay and lower Torbay (floodplain) catchments.

SURVEY DETAILS	COMMENTS

Location: **6626, 2774, 6059** Upper catchment **Survey Method:** On-site assessment with landowner **Survey conducted**: September 2000	**Fencing** ***Majority unfenced.*** *Soil and banks* Dense native riparian vegetation along the watercourse throughout the property has protected the soil and banks from erosion. **Major erosion and siltation** Major channel erosion (headcut) on the southern boundary of the property has been arrested with construction of a causeway. This has been extremely effective in preventing the headcut from eating its way further upstream. Several tonnes of laterite were placed in the deepening channel, with the causeway built over the rocks – clay layer, log, black plastic, then crushed gravel to form a stable bed. Sediment moving from further upstream has backfilled the eroded stream bed above the crossing, to reform the original shallow stream bed. In this instance the deposition of sediment has had a beneficial effect, however the sediment transport is evidence of large scale erosion or perhaps even excavation of watercourses further upstream. Digging of channels through natural riparian vegetation and watercourses is not recommended due to numerous downstream impacts. *Stock Crossing* The constructed, stabilised stock / vehicle crossings on this property appear to be low maintenance, and are very effective in minimising the risk of soil and bank erosion at these points. **Vegetation and Foreshore Condition** The riparian vegetation is generally in excellent A3 Grade condition. Extremely dense, impenetrable teatree thickets. Whilst the impact of cattle trampling on the native vegetation is evident, this would rapidly cover once stock are fenced out. **Weeds** Maurice has successfully eradicated taylorin and other weeds from this property – none evident. **Fire Management** The riparian vegetation has not been burnt for 30 years. Burning is not recommended, as the disturbance leaves bare areas of soil open to weed invasion. Once established, invasive weed species can be difficult to eradicate and tend to displace native species.

FORESHORE CONDITION REPORT AND MANAGEMENT

RECOMMENDATIONS *for Maurice and Sandra McCormick* **continued**

Fertiliser Application

Very low levels of superphosphate are applied – only half a bag to the acre. Clover pastures and stock are in excellent condition. On sandy soils Matrix is applied (a by-produce of copper mining, produced by the Elverton Copper Mine, Ravensthorpe). This contains trace elements (P, Cu, S, Mg, Fe, K, Mn, Zn, Co, Mo, B). The Matrix is spread with gypsum (gypsum is heavier, wetter; Matrix is fly-away), as well as dolomite.

Cattle condition has improved and cattle have glossier coats. The McCormick's have reported 100 bales to the acre, and during 2000 had 45 head of cattle on 20 acres for 3 weeks. Maurice does not worm his cattle and believes the teatree that stock feed on acts as a natural worming agent.

Issues

The McCormicks are concerned about alterations to channel direction and water flow on upstream and downstream properties. Downstream this has resulted in a large headcut which moved upstream onto their property. Alterations to surface flows on adjacent upstream properties has redirected flows from one channel into another, resulting in the road, culvert and upstream channels washing out onto the McCormick property. A dam on the property that previously took 4-5 hours to fill, now takes one hour to fill with heavy flows.

RECOMMENDATIONS:

- Erect stock proof fence along watercourse, including riparian vegetation, utilising Torbay Catchment Group funds.
- Recommend against the use of fire as a management tool, as this disturbance may lead to weed invasion into pristine areas of riparian vegetation.

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