



FRIENDS OF SCOTCHMANS CREEK

AND VALLEY RESERVE

Inc. A0037872K

Scotchmans Creek

State of the River



March 2019

Scotchmans Creek – State of the River

Table of Contents

Introduction.....	3
Description of the River	5
<i>Hydrology and Downstream Environment</i>	5
<i>Land Management</i>	6
Environmental and Social Values	6
<i>Value to the Community</i>	6
<i>Education (Community, Schools, Tertiary etc.)</i>	7
Environmental Status	9
<i>Water Quality</i>	9
<i>Chemical and Physical Monitoring</i>	11
<i>Macroinvertebrates</i>	13
Flora	15
<i>Instream vegetation</i>	15
Fauna	16
Environmental Issues	17
<i>Weeds (Woody and Other)</i>	17
<i>Water Flow Issues and Erosion</i>	18
<i>Litter</i>	20
<i>Pollution</i>	20
Conclusions.....	21
<i>Urban Development Pressures</i>	21
<i>Water Quality, Litter and Pollution</i>	22
<i>Community Value</i>	22
<i>Climate Change</i>	22
Environmental Mitigation Proposals.....	23
<i>Land Management</i>	23
<i>Urban Planning</i>	24
<i>Education</i>	24
<i>Signage</i>	24
Appendix 1: References and Additional Reading.....	24
Appendix 2: More Waterwatch Habitat Assessments.....	25
Appendix 3: Fauna Sightings along Scotchmans Creek	26

Scotchmans Creek – State of the River

Introduction

This report has been produced by the Friends of Scotchmans Creek and Valley Reserve (FSCVR). The chief author is our River Officer, Carlie Dann assisted by other members of the FSCVR committee.

FSCVR is a local community group, based in the city of Monash, and focussed on the care and protection of the Scotchmans Creek corridor, and the adjacent Valley Reserve. We operate from as far up Scotchmans Creek as is accessible, down to where the river flows under Stanley Avenue – a distance of about 4 km.

FSCVR was formed in 2001 as the result of a merger between Friends of Valley Reserve (founded in 1981) and Friends of Scotchmans Creek (founded in 1998). We do not claim any specialised scientific knowledge, and this report does not seek to be a scientifically rigorous analysis of the river environment. It does however paint a picture of the value of how the community views the river, and illustrates some of the issues and pressures the river is under.

We hope that the report will be useful as a response from the community to the work being undertaken on its behalf, by Melbourne Water, Monash City Council, and other government bodies (such as the Environment Protection Authority). We would like to see the report treated as an authentic community view of the state of the river, and as a resource for future consultative planning with the community.

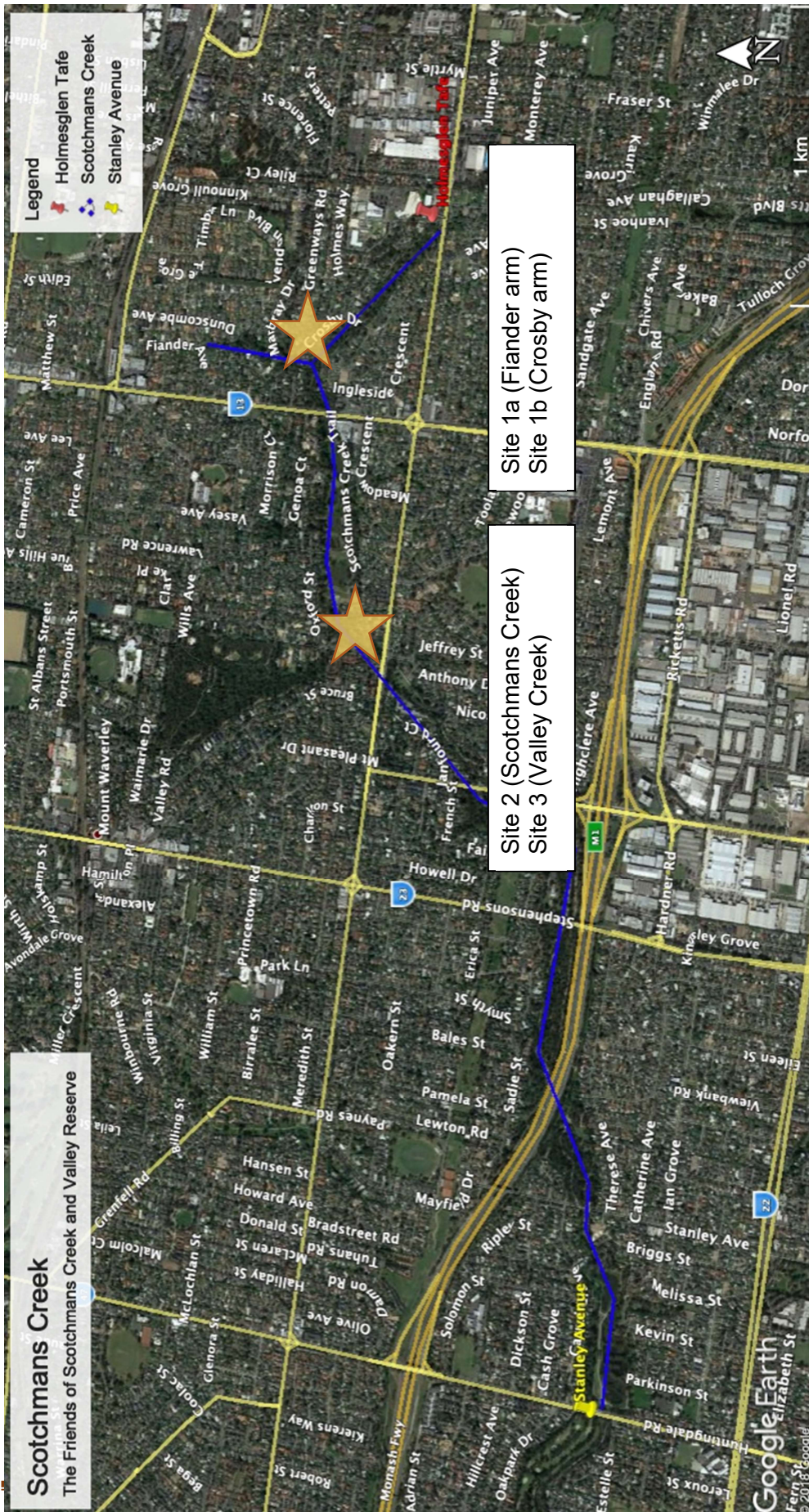
As a Friends group, we are grateful for the support and help provided by Monash Council and Melbourne Water throughout the time we have been in existence.

Note: Scotchmans Creek is an urban river system. As such, we have referred to it as a river (rather than a creek) throughout this report.



View along Scotchmans Creek near Regent Street

Scotchmans Creek – State of the River



Map 1: The publicly accessible part of Scotchmans Creek of concern to FSCVR runs from Fiander Avenue in Syndal through to Stanley Avenue (some 300 metres above the Huntingdale Wetlands). It also has an arm known as the Glen Waverley Drain which emerges at Waverley Rd adjacent to Holmesglen TAFE. (Google Earth Pro, 2019).

FSCVR Waterwatch sites



Description of the River

Scotchmans Creek is located approximately 22km southeast of Melbourne, Victoria and is situated in the Port Phillip and Westernport catchment management area. Scotchmans Creek is located within the Gardiners Creek catchment which in turn is located within the Yarra catchment. Scotchmans Creek is entirely in the City of Monash, running from Syndal at the east end into Gardiners Creek at the west end.

The reach chosen for this State of the River report runs from the Fiander arm of Scotchmans Creek where it emerges from private property, to Stanley Avenue upstream of the Hutingdale wetlands. It also includes the Glen Waverley Drain outside Holmesglen TAFE (Waverley Campus) in Glen Waverley. Please see Map 1 on page 4.

Hydrology and Downstream Environment

Being an urban river, the channel has been highly modified and water flow is predominately storm-water driven. Erosion from the river banks has caused the river to create pools and change the valley form over time. Considerable bank stabilisation work involving the importation of large boulders has been undertaken by Melbourne Water over the last 20 years.

The river and surrounding areas are highly susceptible to flooding with heavy rainfall. Water flow in the river is enormously variable. The lowest measure of river flow at Regent Street we have recorded is 11 litres per second. The highest is over 1750 litres per second (Melbourne Water rain gauge, as it is too dangerous for us to measure water flow in flood events). The river has never ceased to flow in the time we have been monitoring (2005-19).



Water overtopping the Mount Waverley Wetlands Dam in 2005

Scotchmans Creek – State of the River

The river emerges from an extensive network of stormwater drains into two arms - Fiander and Crosby – the Crosby arm being correctly known as the Glen Waverley Drain. The two arms of the river meet East of Blackburn Road. At the confluence, there is a large litter trap. After passing under Blackburn Road, the river enters the Waverley Road Retarding Basin also known as the Mount Waverley Wetlands, where it is intended to flow through a number of ponds before passing under the Retarding Dam East of Regent Street.

In practice, the Mount Waverley wetlands is not performing as designed, and most water passes through an overflow pipe (underground). Melbourne Water is aware of this problem and is considering what remedial action is appropriate.

After passing under the retarding dam, Scotchmans Creek flows parallel to Regent Street, passes under Waverley Road, flows South West to Forster Road, and then parallel to the Monash Freeway in Fairway Reserve. After passing under the Monash Freeway via a set of tunnels, the river continues southwest to Stanley Avenue.

The Huntingdale Road Wetlands is situated downstream of the FSCVR area of concern and begins west of Stanley Avenue. Water flows from the river through a large litter trap and into a sedimentation pond, before entering an S-shaped flood-retarding basin. After water exits the Huntingdale Road Wetlands, it flows further down Scotchmans Creek which passes beside the Oakleigh Public Golf Course and eventually into Gardiners Creek.

Land Management

Scotchmans Creek runs through the traditional lands of the Bunurong and Wurundjeri people of the Kulin nation (Walker, 2016). Presently, Melbourne Water manages the river itself (water and both banks) and the City of Monash manages the land surrounding the river (from riparian zone outwards). Certain land management activities such as mowing in the Mount Waverley Wetlands, are carried out by Monash Council on behalf of Melbourne Water.

Environmental and Social Values

The Scotchmans Creek corridor provides a fairly continuous band of native bushland 10 to 50 metres wide, stretching across much of Syndal, Mount Waverley, and towards Chadstone. It is important as a wildlife corridor, allowing small animals and birds to travel fairly safely along the river, and to adjacent parkland such as Valley Reserve.

Value to the Community

Scotchmans Creek is an extremely popular area with the Scotchmans Creek Trail running the entire length of the river. This trail is utilised daily by walkers, bicycle riders and dog walkers and is considered an area of high amenity by Melbourne Water. Along many stretches of the river, houses back onto the Scotchmans Creek Trail and have easy access to the trail and river from their backyards.

There are also various areas to sit and relax with chairs and tables situated at different points along the river and fishing (particularly in the Huntingdale Road Wetlands) is popular among locals as well.

The Friends of Scotchmans Creek and Valley Reserve host a wide range of events that are open to the public including:

Scotchmans Creek – State of the River

- ❖ National Tree Day
- ❖ Positive Aging Life Styles (PALS) walking events
- ❖ Clean Up Australia Day
- ❖ Guest speakers at our meetings (e.g. experts in conservation, Monash Council staff, Melbourne Water staff etc.)



Community Waterwatch session in 2018

We also run monthly Waterwatch (water quality testing) sessions, weeding sessions and various tree plantings along Scotchmans Creek that Monash residents are encouraged to attend to learn more about their local environment.

Our experience has been that the local community is closely aware of events affecting the river and its environs, and place considerable value on the amenities afforded by the river and the bushland corridor along it.

Education (Community, Schools, Tertiary etc.)

The Friends of Scotchmans Creek and Valley Reserve work with many local school groups offering experience and workshops to environmental students of all ages. The experience gained from these sessions we offer can include tree planting, weed management, water quality testing, fauna and flora identification, and more. A number of local schools have made use of these workshops, and one secondary school has embedded them into its curriculum at various levels through the school.

We run school group tours of the river and both wetlands (Mount Waverley Wetlands and Huntingdale Road Wetlands) for children from age 5 to 18 plus offer many different types of excursions as well. We have also worked with local Scout groups.

At the tertiary level, we have in recent times, worked with Holmesglen TAFE (Waverley Campus), Melbourne University, Monash University and RMIT.

Scotchmans Creek – State of the River

FSCVR runs plantings each year along the river working with local businesses, and the community. These plantings are supported by grants from Melbourne Water and by Monash Council's Horticulture group. Our biggest planting – part of National Tree Day - is attended by up to 150 volunteers, and we plant 8000 plants in a morning. In total, we have planted almost 200 000 plants along the river corridor over the past 20 years.



Community Planting at Crosby Drive

Environmental Status

FSCVR regards the environmental status of the Scotchmans Creek corridor as our key area of interest, and we have been working with our partners, Monash Council and Melbourne Water, to enhance the habitat quality and biodiversity of the corridor, and to restore indigenous vegetation along the river.

Water Quality

FSCVR has been part of the national Waterwatch program since 2005. During that time we have carried out monthly waterwatch sessions (except Decembers) on a number of sites along and adjacent to the river.



FSCVR and volunteers at a waterwatch session

Waterwatch Sites (see map 1 on page 4)

All sites are considered to be a stretch of around 50 metres up and down stream of a selected point. In practice this is somewhat variable depending on the local geography.

Site 1a: Main Scotchmans Creek (Fiander arm) immediately downstream from pedestrian footbridge about 300 metres East of Blackburn Rd.

Site 1b: Glen Waverley Drain (Crosby arm) about 75-100 metres upstream of the confluence with Fiander arm.

Scotchmans Creek – State of the River

Site 2: Scotchmans Creek adjacent to Regent Street, 100 metres downstream of pedestrian bridge (immediately downstream from confluence with Valley Creek).

Site 3: Valley Creek immediately downstream from tunnel under Regent Street (about 50 metres upstream from confluence with main Scotchmans Creek.)

Habitat Assessments

We measure habitat quality by measuring five factors:

- ❖ Bank vegetation (10 points) – the bank is from the water’s edge to the break of slope
- ❖ Verge vegetation (10 points) – the verge is adjacent to the bank, as far as the river affects the surrounding environment (in practice, up to 50 metres either side)
- ❖ In-stream vegetation (10 points) – the amount and variety of aquatic vegetation in the river
- ❖ Erosion and bank stability (5 points) – the severity and extent of active erosion along the river banks
- ❖ Pools, bends and riffles (5 points) – the variety of deep and shallow places, bends, fast and slow flowing places etc.

The scores for the five factors are summed to give a total out of a possible 40 points.

We have assessed each site yearly at approximately the same time every year: A brief summary of selected results is shown below. Equivalent information about the Fiander arm and Crosby arm can be found in Appendix 2.

	Scotchmans Creek Regent Street (Site 2)				Valley Creek (Site 3)			
	2006	2010	2014	2018	2006	2010	2014	2018
Bank vegetation	4	7	6	6	6	7	6	6
Verge vegetation	5	7	6	6	7	8	6	6
In-stream vegetation	6	7	6	8	7	8	8	8
Erosion and stability	3	4	3	3	4	5	4	4
Pools, riffles, bends	2	3	3	3	3	4	4	4
Total (out of 40)	20	28	24	26	27	32	28	28
Assessment	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair

The ratings reflect the realities of an urban stream corridor, with frequent disturbance and recovery. Periodic bank stabilisation work, pollution events (particularly in Site 1b (Crosby arm), dredging of the stream channel, and removal of exotic vegetation and subsequent revegetation with indigenous vegetation have all affected habitat quality.

Scotchmans Creek – State of the River

Given the increased population and development pressures adjacent to the river, the results show broadly that the river habitat is holding its own and many readings are near the margins of Fair/Good. This reflects much hard work by Monash Council and Melbourne Water, assisted by groups such as FSCVR.

Chemical and Physical Monitoring

We carry out a number of chemical and physical measurements each month, designed to give a picture of the state of the river:

- ❖ Ph (acidity/alkalinity)
- ❖ Turbidity (clarity of the water)
- ❖ Dissolved oxygen (higher levels support more aquatic life)
- ❖ Conductivity (measures the amount of dissolved salts in the water)
- ❖ Ammonia and Nitrates (most often derived from fertiliser and sewage pollution)
- ❖ Phosphorus
- ❖ Water flow (Scotchmans Creek flow is very variable)
- ❖ Amount and variety of litter
- ❖ Appearance of the water (colour, odour, visible pollution etc.)

Water Temperature:

In winter, Scotchmans Creek water is typically 9-12 degrees Celsius; in summer, typically 20-22 degrees Celsius.

Turbidity:

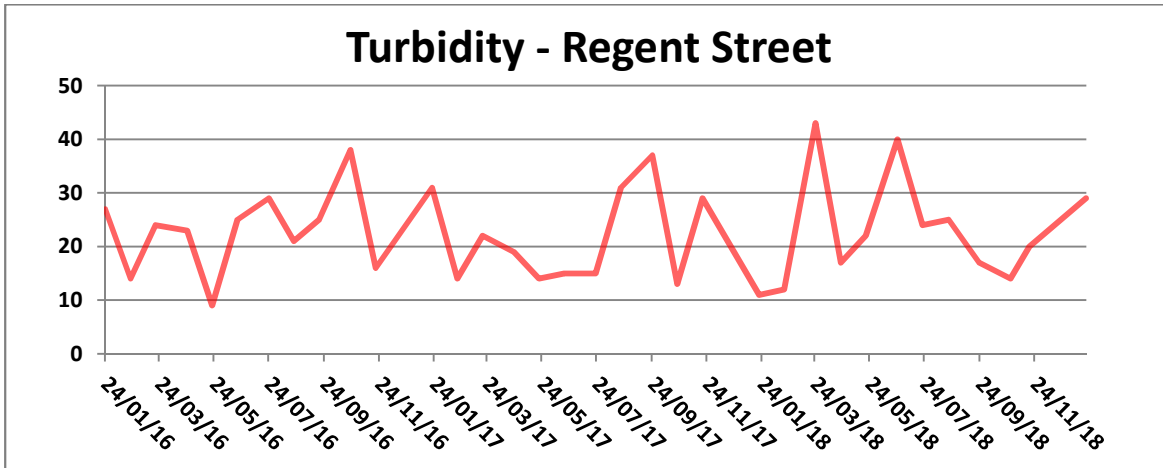
Turbidity measures the clarity (or otherwise) of the water. The lower the reading, the clearer the water. Theoretically, pure, distilled water would have a turbidity of 0.

A graph of Scotchmans Creek Turbidity from 2016 to 2019 is shown below. As can be seen turbidity varies considerably depending on water flow – after heavy rain, turbidity is higher.

It is difficult to know what the 'natural' turbidity for a river like Scotchmans creek would have been prior to urbanisation, but, like the Yarra River it is likely that the water would never have been very clear.

Very high turbidity tends to suppress instream vegetation which is essential to support most aquatic life. At Regent Street, turbidity is generally at a 'Fair' level. This means that whilst the river is too turbid for many very sensitive creatures, it can support moderately tolerant and tolerant creatures.

Scotchmans Creek – State of the River

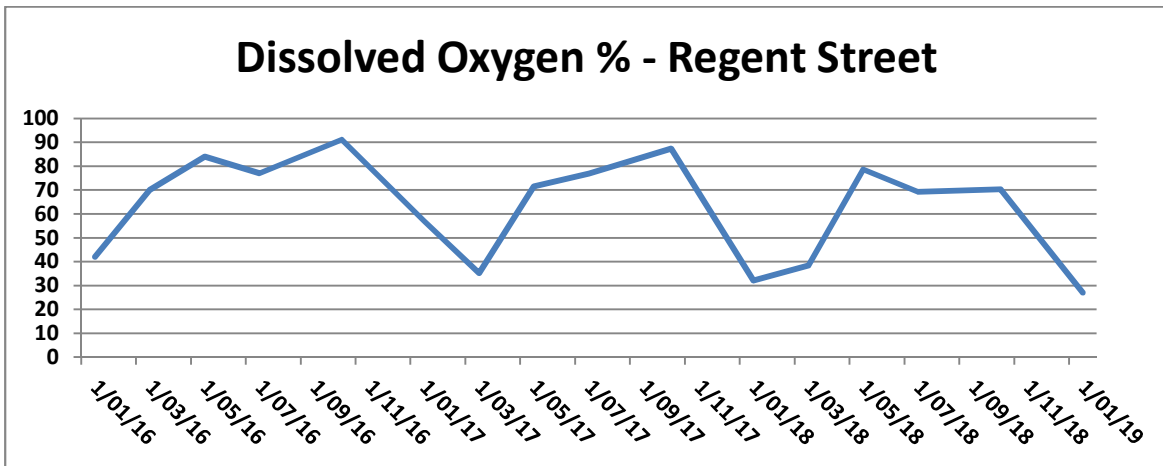


Dissolved Oxygen

Another important measure of river health is the amount of dissolved oxygen in the water – necessary to support aquatic life. Dissolved oxygen is measured as a percentage of saturation (100% represents the maximum oxygen that could ideally be present).

In times of very low flow, dissolved oxygen is lower, as the river is not turbulent, and so cannot take up oxygen in solution. This is most often seen in summer.

As the graph shows, Scotchmans Creek generally has relatively high levels of dissolved oxygen which allows for more aquatic life.



A river like Scotchmans Creek is obviously affected by the urban environment around it. As an example, after a significant rain event following a dry period, the water is visibly blackish in colour, probably due to brake dust and fine tyre debris washed in from roads. However the Ph is usually only slightly acidic, well within the limits needed to support aquatic creatures.

The water quality in Scotchmans Creek at Regent Street is generally in the 'Fair' range, which in practice supports a reasonable range of aquatic life.

Scotchmans Creek – State of the River

Macroinvertebrates

Macroinvertebrates are the small (but visible to the naked eye) creatures living in the river other than fish and tadpoles:

We most often find Dragonfly larvae, Damselfly larvae, aquatic beetles such as water boatmen and back swimmers, aquatic leeches, water snails, aquatic flat and segmented worms, and bloodworms. We also find caddisfly larvae, yabbies (freshwater crayfish), freshwater mussels and needle bugs.



Yabby found in Valley Creek sample

In a river like Scotchmans Creek, a useful indicator of river health are the number of Dragonfly and Damselfly larvae (Order Odonata) numbers (they are both moderately tolerant of minor pollution).



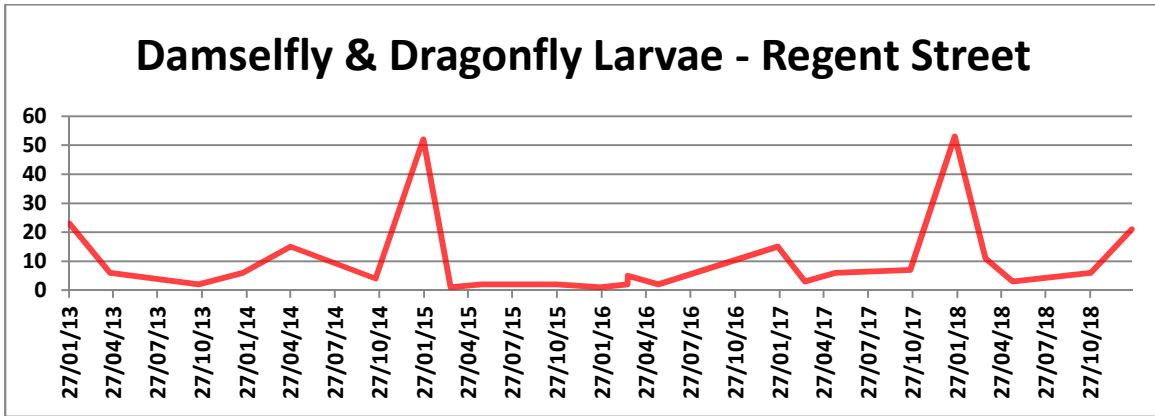
Dragonfly larva



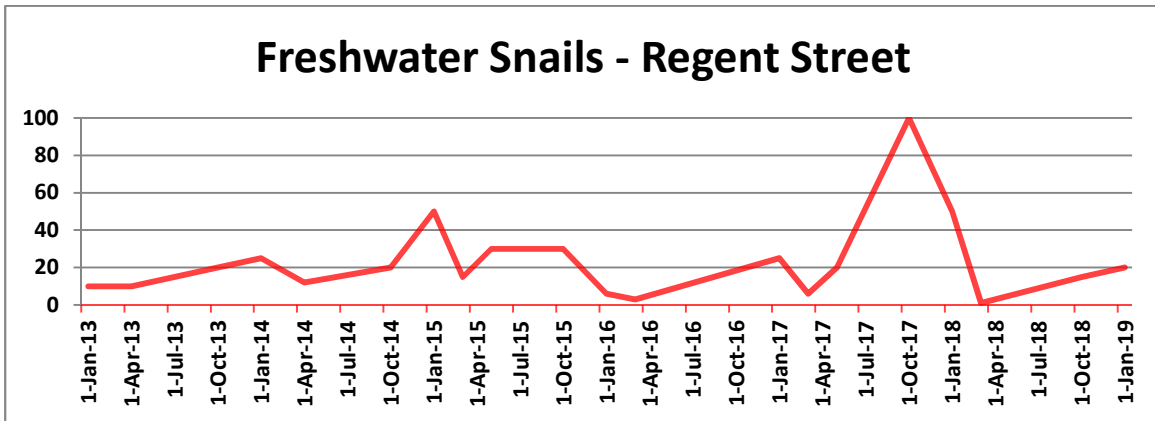
Damselfly (l) and Mayfly (r) larvae

A graph of the numbers of Damselfly and Dragonfly larvae found at Regent Street shows how they have varied over the last 6 years. Not surprisingly they tend to be commonest in spring, but if there has been poor rainfall, or a recent major flood event, numbers will be affected.

Scotchmans Creek – State of the River



Another useful indicator is the number of the more tolerant water snails. Freshwater snails are less variable in quantity generally, but do show occasional strong peaks for no obvious reason!



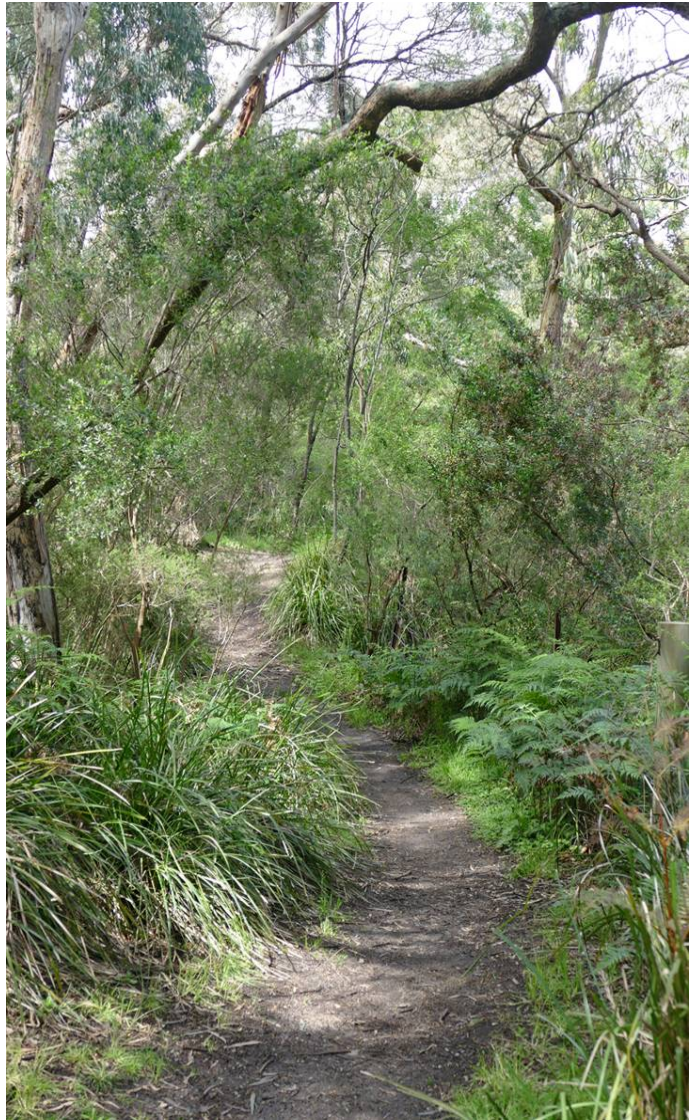
You can find out more detail about our results and findings on our web site (see Appendix 1)

Flora

Being a highly urbanised area, much of the vegetation that was recorded to be in the area Pre-European settlement has been cleared. According to the DELWP (Department of Environment Land, Water and Primary Industry) NatureKit, there are still a few patches of Swampy Riparian Woodland and Valley Heathy Forest along the river, with Swampy Riparian Woodland being the most dominant along the river line.

Swampy Riparian Woodland and Valley Heathy Forest are now considered Endangered and works need to be carried out in the reach to achieve pre-European quality vegetation

Through considerable effort by Monash Council and the community, a more-or-less continuous belt of indigenous bushland of between 10 and 30 metres width has been re-established along the river. Most of the woody exotic plants have been removed although some exotic trees still exist along the South bank of the Crosby arm of the river. There are plans to remove these in the near future.



Bushland Track in Valley Reserve

To find out more information about the typical species present and planted along Scotchmans Creek by The Monash Council bush crew or The Friends of Scotchmans Creek and Valley Reserve, please see the Gardens for Wildlife booklets (provided by Monash Council) or visit <http://www.scotchmanscreekfriends.org.au/events.htm> for previous planting day records

Instream vegetation

In certain sections along the river, there seems to be small patches of high quality in-stream vegetation. In the section of Scotchmans Creek where Regent Street meets with Waverley Road, there is quite a healthy section of in-stream vegetation and through our Waterwatch sessions, we have observed a larger number of macroinvertebrates in this area than any of our other sites.

Scotchmans Creek – State of the River

In some other areas (particularly the Fiander arm of the river) however, there is an almost complete lack of in-stream vegetation, which adds to an increase in water velocity during heavy rain (with nothing to slow the water down), and a decrease in habitat for macroinvertebrates, fish, reptiles and other native fauna. In-stream and ephemeral vegetation can also improve water quality, help prevent erosion and keep litter from reaching the river.

Fauna

During our site visits along the reach, birds were the main type of fauna that were observed. Most birds that were observed during the assessments were large to medium size and it was noted that there seemed to be a scarcity of small birds along the river. This could be due to the lack of medium shrubs and protective ground layer in some patches along the river, creating gaps in the wildlife corridor where these smaller birds cannot move through.



Powerful Owl near Scotchmans Creek

Improving this part of the river will not only improve water quality to hopefully bring fish and other reptiles (e.g. tortoises) back into the river, it will also create a healthier wildlife corridor to hopefully bring small birds, along with possums and other native fauna, back into the area.



Possums are common in the river corridor

Appendix 3 provides a list of native and introduced fauna observed along the reach by the FSCVR surveyors during four recent river assessments.

Environmental Issues

Weeds (Woody and Other)

During our site assessments, there were a few main weeds that were recorded on every visit. These include;

- ❖ *Tradescantia fluminensis* (Wandering Trad)
- ❖ *Allium triquetrum* (Angled Onion)
- ❖ *Fumaria capreolata* (White-flower fumitory)
- ❖ *Galium aparine* (Cleavers/Stickyweed)
- ❖ *Ranunculus repens* (Creeping Buttercup)
- ❖ *Hedera helix* (English Ivy) and *Ipomoea indica* (Blue Morning Glory) growing over some neighbouring property fences
- ❖ *Zantedeschia aethiopica* (White Arum Lily)
- ❖ Weedy grasses (*Ehrharta erecta* Panic Veldt Grass)



Hedera helix (English Ivy) and *Ipomoea indica* (Blue Morning Glory)

In some sections, indigenous plants were being smothered by introduced species e.g. *Lomandra longifolia* being completely smothered by *Fumaria capreolata*.



Lomandra longifolia and *Fumaria capreolata*

Other weeds were observed during our site assessments, however we believe the weeds mentioned above should be of top priority for removal.

Scotchmans Creek – State of the River

Water Flow Issues and Erosion

Scotchmans Creek, like many urban rivers, has had its course affected by human influence. The course of the river has been straightened and embankments added.

Increased intensity of urban development has drastically increased the rate of stormwater runoff (water which was once retained in lawns and gardens and released slowly is now flowing across concrete driveways etc., and arriving in the stormwater system very rapidly.)



Scotchmans Creek in Flood

These two factors have resulted in an increase in the velocity of water flowing in the river system, and a massive increase in the energy of water during rain events. As a result, erosion is a substantial issue on both sides of the river and is causing slumping and undercutting of the banks at many points along the river.



Slumping and undercutting at Regent Street

Scotchmans Creek – State of the River

There is severe local erosion in the Crosby arm of the river (the Glen Waverley Drain) above Crosby Drive. Melbourne Water has done considerable remedial work emplacing very large boulders in an effort to stabilise the banks and reduce the damage.

There is some concern about possible danger to the cycle/pedestrian path (Scotchmans Creek Trail), which in that section, runs along the North bank of the river.



Erosion in the Glen Waverley Drain

Large areas of erosion have occurred at the roots of various trees along the river and may in future pose a major risk for some of the larger trees along the river. This implies a risk to both the river environment and human life (if the trees were to fall down from the erosion). The erosion can also cause dirt, sand and sediment to accumulate in areas in the creek bed causing changes in hydrology and channel width and suppressing instream vegetation.

Because of upstream erosion, the functioning of the Mount Waverley Wetlands (Melbourne Water RB108) has been compromised by the amount of sand and gravel being transported by the river. At this time (March 2019) Melbourne Water is monitoring the wetlands in an attempt to evolve a plan for remedial action, but it seems likely that major redesign may be needed.

The river is intended to pass through the wetlands via a series of ponds, linked by inverted syphons, with higher flow diverted to an underground pipe, but the wetlands have never consistently been able to operate as designed due to the amount of sediment being transported – the syphons are very easily blocked by sand.

In the Regent Street arm of the river, recent (2016) removal of very large old Willow trees has changed local bank and bed conditions. This reach represents an important bushland regeneration opportunity, which is already being addressed by Monash Council.

The Fairway reserve reach of the river has been channelised extensively and is partly in an open concrete channel. Extensive bushland regeneration has occurred along this reach, and some willow trees have been removed, but local erosion is still evident in stretches not channelised.

Scotchmans Creek – State of the River

Litter

Litter is another major issue along the reach and causes threat to the native wildlife that inhabits the river. Apart from the fact that litter can block drains/pipes/litter traps, leach toxic chemicals into waterways and reduce water quality, native fauna can also mistake it for food and it can become a breeding-ground for pest insects and rodents that are carrying disease.

Common types of litter recorded along the river during site assessments include:

- ❖ Dog excrement and dog excrement bags
- ❖ Polystyrene
- ❖ Plastics (bags, bottles, tapes)
- ❖ Miscellaneous materials hanging in trees
- ❖ Tyres
- ❖ Construction materials
- ❖ Aluminium drinking cans
- ❖ Cigarette butts
- ❖ Spray cans
- ❖ Confectionary wrappers



Litter near Blackburn Road

Pollution

Scotchmans Creek is subject to numerous sources of pollution:

- ❖ Runoff from roads contains brake dust and tyre detritus which colours the water gray-black where heavy rain follows a dry period
- ❖ Periodic runoff from building sites containing cement dust and other fine building material is a frequent, though generally transient source of pollution, It often renders the water turbid for a day or two
- ❖ Industrial pollutants – most seriously, a slow, long term leaching of PCB laced transformer oil had a disastrous effect on instream vegetation (and hence macroinvertebrates) in the Crosby arm. The effects were felt to a lesser extent downstream. The river took several years to recover from this pollution

Scotchmans Creek – State of the River

- ❖ Occasional dumping of greasy waste – most probably from food shops, which in times of low flow, takes some time to wash through the river



- ❖ Occasional dumping of brightly coloured dyes (red, green and blue at different times). As far as we can tell, these do little harm but do render the water cloudy and unsightly until they clear.



Conclusions

Urban Development Pressures

Scotchmans Creek is an urban river system, and many of its issues are due to intensive urban development adjacent to the river. In particular the width of the river corridor is constrained in many places by housing and other developments. Whilst some progress has been made recently towards better control of development adjacent to the river, it is important that better management of the environment around the river be given high priority.

The river is an integral part of the Monash City environment and cannot be considered in isolation.

Scotchmans Creek is severely stressed by rapid stormwater runoff, exacerbated by the increase in impermeable surfaces in Monash. The river system urgently needs a slowing of rainfall runoff, through raingardens and other ways of slowing water runoff and release.

Scotchmans Creek – State of the River

Water Quality, Litter and Pollution

As has been noted, litter is a major problem. It is easy to see the height reached by the water after every rain event, by the litter suspended along bank and verge vegetation. More needs to be done to intercept litter before it reaches the river system.

Pollution events continue to affect the river environment too frequently. They often involve the entry of oil based substances, chemicals and dyes, and occasionally sewage, into the river system. Most of the pollution events we have observed could have been avoided by better education, and where necessary, penalties.

The water quality in Scotchmans Creek is generally fair, despite some instances of industrial and commercial pollution. We continue to find moderately tolerant macroinvertebrates such as dragonfly and damselfly larvae in reasonable numbers, and we also find tadpoles in varying numbers. Frogs can be heard along the river, and five species have been identified locally. Dissolved oxygen levels are generally good, and the water pH is close to neutral.

We have not seen a sustained deterioration in overall water or habitat quality during the time we have been monitoring the river.

Community Value

The community places a high value on the Scotchmans Creek corridor. The Scotchmans Creek trail is heavily used by walkers and bike riders alike. In addition schools and tertiary institutes use it for learning and research. In summer, the corridor is noticeably cooler than adjacent streets, and at a time when tree cover in Monash is steadily being lost, the Scotchmans Creek bushland corridor is doubly valuable.

Monash Council has done much work over the last 20 years in educating the community about the value of native bushland, and in appreciating the biodiversity we still have. However, given the transient nature of sections of the Monash City population, this work needs to be continued and intensified.

Some local schools, tertiary education institutions and Scout groups are already actively involved with us in caring for the local environment, and we would like to grow and develop this further in the future.

We are already working with some local businesses to carry out planting along the Scotchmans Creek corridor, and we believe that many more businesses would be interested in contributing if the opportunity arose.

Climate Change

We do not profess to be climate change experts, but we accept the science that tells us that climate change is happening and is ongoing – indeed is likely to accelerate in the short term. Resources such as Scotchmans Creek become more and more important to the preservation of our local wildlife and biodiversity in an increasingly difficult environment.

We have attempted to identify key actions we believe need to be taken over the next few years to preserve and improve the river environment along Scotchmans Creek, in the 'Environmental Mitigation Proposals' section of this report.

Environmental Mitigation Proposals

We believe that there are certain key actions that can be taken to preserve and enhance the Scotchmans Creek corridor, and build on the good work already undertaken.

Land Management

Linear Park

We recommend that the Scotchmans Creek corridor be recognized as a linear park in the City of Monash. It should have an integrated management plan covering the entire river within the City of Monash, and related closely to the management plans for adjacent parkland such as Valley Reserve.

It is vital that close liaison between Monash Council and Melbourne Water is embedded in this management plan and the plan covers a sufficiently long time-frame to support a strategic view of the future of Scotchmans Creek as a community resource.

Weed Removal

We recommend that *Tradescantia fluminensis* (Wandering Trad), *Hedera helix* (English Ivy) and *Ipomoea indica* (Blue Morning Glory) are of high priority for removal, especially those that are coming over from neighbouring properties. These weeds are all rapid invaders and have the ability to cover large areas of indigenous vegetation at a fast rate.

Considering that there are small individual *Zantedeschia aethiopica* (White Arum Lily) plants scattered along the river, we recommend removing them as a top priority also, to keep it under control and reduce further spread.

Planting

We believe that any revegetation undertaken along the river should promote a healthy wildlife corridor for native animals of all sizes to utilize.

As we noticed a lack of small birds during our site assessments, we recommend planting a middle-story and increasing the indigenous ground cover along the upper banks of the creek, focussing specifically on protective shrubs and ground covers to promote bringing small birds back into the area.

We also recommend planting more hardy ephemeral plants along lower river banks (to withstand flooding, reduce litter reaching the river, reduce erosion and decrease speeds of water flow - especially during heavy rainfall and flooding) and in stream vegetation (to improve water quality and flow, and provide habitat for fauna).

Renaming the Glen Waverley Drain

Regardless of how simple this recommendation may seem, we believe that renaming the Glen Waverley Drain will help local residents see that section of the creek in a different light and possibly feel more connected to it. The fact that it is named a “drain” may cause local residents to feel a lack of compassion towards it, and treat it as they would a drain rather than a living creek which leads to a lack of care in trying to protect it.

We believe that this is a necessary step in further protecting this section of the creek and strongly recommend renaming it to something of local or historical significance.

Scotchmans Creek – State of the River

Urban Planning

The rate of residential and commercial development occurring in Victoria is rapidly growing and causing a massive detriment to our natural environment. There are many impacts that occur during and after development that put a huge strain on our natural areas, such as;

- ❖ Erosion and sediment flowing into the creek during wind, rain and storm events
- ❖ Removal of indigenous vegetation and typically an increase in concreted areas, causing an increase in quantity and velocity of storm water (run off) during storm events
- ❖ Chemicals and toxins being leached into waterways
- ❖ Litter
- ❖ Decrease in habitat for native fauna

We recommend creating and enforcing stricter laws in relation to over/inappropriate development as we believe that the current laws are not doing enough to protect precious vegetation that is on and surrounding development properties along Scotchmans Creek (and other waterways that flow into Scotchmans Creek e.g. Valley Creek).

Education

Education is the key to dealing with neighbouring properties about the weeds/garden escapees that are coming over their fences. We recommend speaking with occupants directly and handing them a Monash 'Gardens for Wildlife' booklet and offering individual advice on planting indigenous plants in their gardens as opposed to exotics, or at least educating them on the importance of keeping exotics under control in their backyards.

Signage

We recommend adding more (and perhaps bigger) signage along the river to remind people to clean up after their dogs. Information on this signage could outline why it's important to pick up dog faeces to educate the public of the implications of leaving it in the environment e.g. dog faeces can harbour viruses and bacteria, as well as being unsightly.

We would also advocate the creation of informative signage along the Scotchmans Creek corridor presenting information on the significance of the corridor, the flora and fauna to be found, and how to get involved. Signage already in place in Valley Reserve provides a good model.

Appendix 1: References and Additional Reading

The FSCVR web site <http://www.scotchmancreekfriends.org.au/> provides information about the friends group, our activities, and how to get involved.

FSCVR also has a Facebook page [facebook.com/fscvr](https://www.facebook.com/fscvr) where you can find news of our events and photos and comments about us.

City of Monash 2018, *Urban Biodiversity Strategy 2018-2018*,

City of Monash 2016, *Environmental Sustainability Strategy 2016-26*,

Scotchmans Creek – State of the River

City of Monash 2018, *Open Space Strategy (Final Draft)*, 2018

City of Monash *Urban Landscape and Canopy Vegetation Strategy*, 2018

Melbourne *Water Healthy Waterways Strategy 2018*

Bull, Marilyn & Stolfo, George, (illustrator.) 2014, *Flora of Melbourne: a guide to the indigenous plants of the greater Melbourne area*, 4th edition, Hyland House Publishing,

Museum Victoria & Museum of Victoria & CSIRO 2006, *Melbourne's wildlife: a field guide to the fauna of greater Melbourne*, Museum of Victoria and CSIRO Publishing, Melbourne

The Waterwatch web site <http://www.vic.waterwatch.org.au/> provides information on the waterwatch program, training and resources

Gooderham, John & Tsyrlin, Edward, 2002, *The Waterbug Book*, CSIRO Publishing

Appendix 2: More Waterwatch Habitat Assessments

The assessments for the main Scotchmans Creek at Regent Street (site 2) and Valley Creek (site 3) are given in the Environmental Status section of this report.

	Site 1a (Fiander arm)				Site 1b (Crosby arm)			
	2006	2010	2014	2018	2006	2010	2014	2018
Bank vegetation	2	8	6	6	3	5	6	6
Verge vegetation	2	6	6	4	5	8	8	8
In-stream vegetation	3	7	6	6	4	4	6	6
Erosion and stability	2	4	4	2	2	2	3	3
Pools, riffles, bends	3	4	4	3	3	2	4	4
Total (out of 40)	12	29	26	21	17	21	27	27
Assessment	Poor	Good	Fair	Fair	Poor	Fair	Fair	Fair

Scotchmans Creek – State of the River

Appendix 3: Fauna Sightings along Scotchmans Creek

Please note: these sightings are recorded ONLY from site assessments undertaken from The Friends of Scotchmans Creek. This is by no means a definitive list of fauna present along Scotchmans Creek.

Fauna	Jan-18	Apr-18	Jun-18	Sep-18
Australian Magpie	x	x	x	x
Red Wattlebird	x	x		x
Noisy Miner	x	x	x	x
Common Myna	x	x		
Kookaburra	x			
Pacific Black Duck	x	x	x	x
Grey Butcherbird	x			x
Rainbow Lorikeet	x	x	x	x
Magpie Lark	x	x	x	x
Spotted Turtle Dove	x	x		x
Pied Currawong	x	x	x	x
Crested Pigeon	x	x		
Little Raven		x		
King Parrot		x	x	
Eastern Rosella		x	x	
Gang Gang Cockatoo		x		
Mallard		x		
Australian Wood Duck		x		
Welcome Swallow		x		
White-faced Heron		x		
Eurasian Coot		x		
Chestnut Teal		x	x	x
Little Pied Cormorant		x	x	
Purple Swamphen		x		
Common Blackbird		x		x
Dusky Moorhen			x	
Common Bronzewing				x
Dragonflies,	x	x	x	x
Frogs(heard)	x	x	x	