Otway Water Book 45

EPBC Act (Federal Government) and Flora and Fauna Guarantee (State Government)

Dramatic Change in such a short time…

www.stopgroundwatermining.com.au

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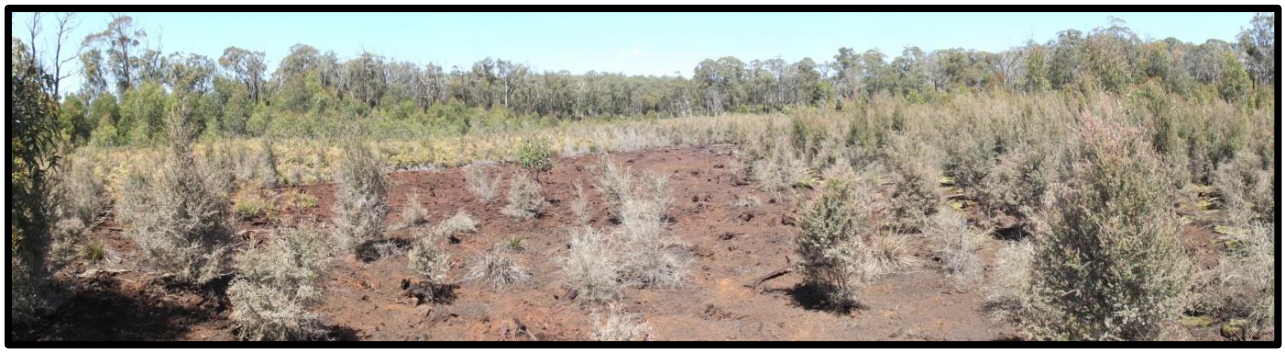
December 2018

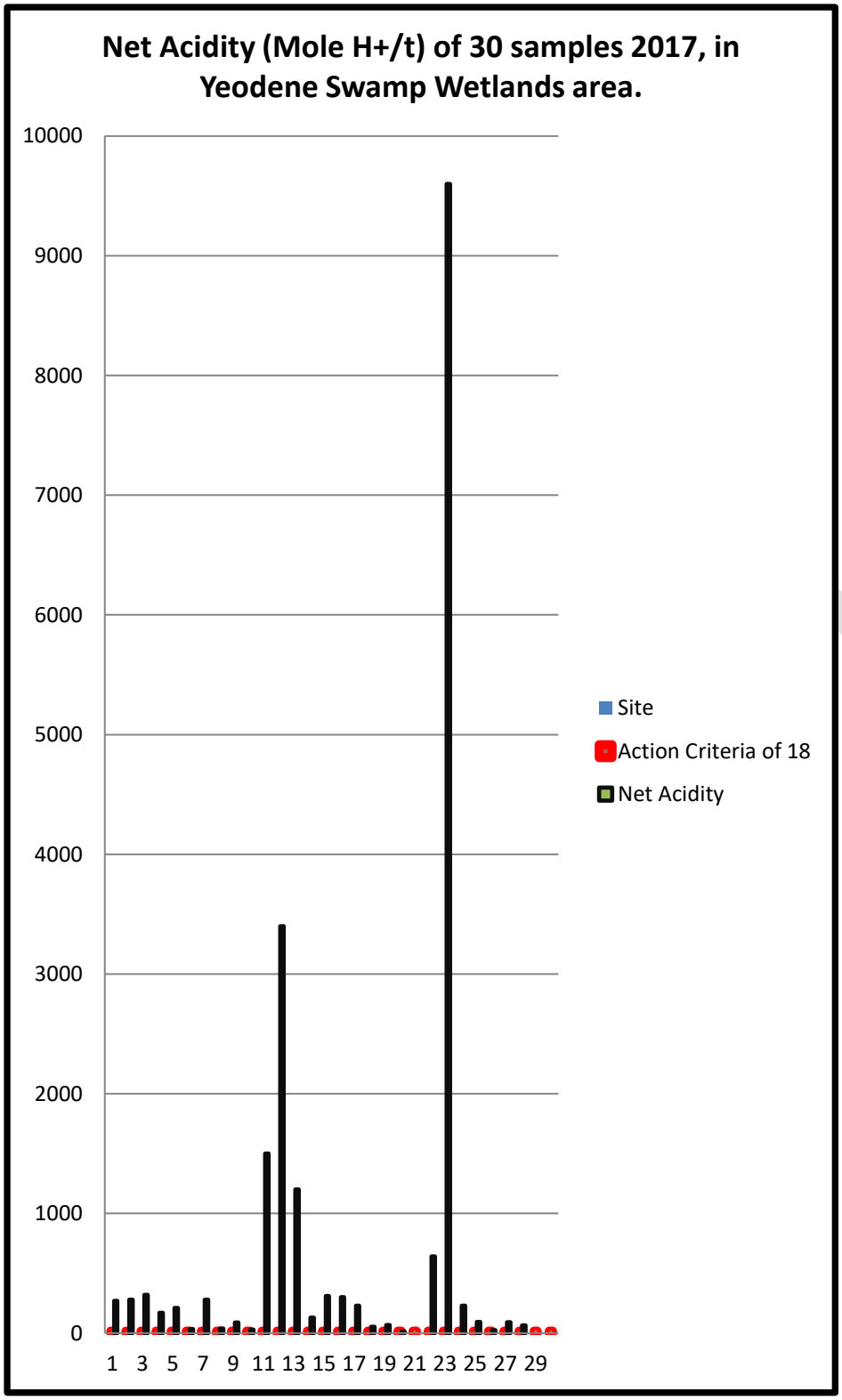
Malcolm Gardiner

Email: otwaywater@yahoo.com.au www.otwaywater.com.au



Actual Acid Sulfate Soil trying to recover.

Creek & soil devastation follows



Figures taken from Jacobs report "Yeodene Swamp Study," (9 November 2017), page 66.

RESULTS OF WATER ANALYSIS Water Samples taken from the Big Swamp (2017) Times Level NHMRC (19 June 2018)

Page 1 of 1

4 samples supplied by Land & Waters Resource Otway Ranges on the 19th June, 2018 - Lab Job No. H1548

Analysis requested by Malcolm Gardiner. Your Project: M. Gardiner, N. Shirley

1805 Colac - Lavers Hill Road KAWARREN VIC 3249

Parameter	Methods reference	Sample 1	Sample 2	Sample 3	Sample 4
		14/6/18	13/5/18	15/5/18	8/6/18
	Job No.	H1548/1	H1548/2	H1548/3	H1548/4
pH	APHA 4500-H+ B	1.91	3.26	3.71	3.56
Conductivity (EC) (dS/m)	APHA 2510-B	7.523	1.074	2.596	2.052
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	5,116	730	1,765	1,395
Acidity (to pH 5.5) (mg/L CaCO3 equivalent)	** Total Acidity - APHA 2310B	5,750	140	175	525
Acidity (to pH 7.0) (mg/L CaCO3 equivalent)	** Total Acidity - APHA 2310B	6,250	175	200	625
Acidity (to pH 8.3) (mg/L CaCO3 equivalent)	** Total Acidity - APHA 2310B	6,550	200	225	640
Chloride (mg/L)	APHA 3125 ICPMS[Note 1&2]	14	121	552	180
Sulfate (mg/L SO_4^{2-})	APHA 3125 ICPMS[Note 1&2]	6,671	143	279	976
Chloride/Sulfate Ratio	** Calculation	0.0	0.8	2.0	0.2
Silver (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.002	0.002	0.001	0.001
Aluminium (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	447 0-2	12.4 2235	33.5	108
Arsenic (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	1.14 0-01	0.002 1.14	0.003	0.009
Cadmium (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.001 0.002	<0.001	0.001	0.002
Chromium (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.414 0-05	0.001 8.28	0.002	0.004
Copper (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.060 2	0.005	0.005	0.005
Iron (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	1,319 643	0.780 4297	0.612	1.31
Manganese (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	1.38 0-1	0.193 12-8	0.441	0.396
Nickel (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	2.02 0-02	0.087 101	0.168	0.349
Lead (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.002 0-01	<0.001	0.001	0.002
Selenium (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	0.093	<0.010	<0.010	<0.010
Zinc (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	3.76 3-0	0.553	0.800	2.31
Mercury (mg/L)	Dissolved - APHA 3125 (ICPMS[Note 1&2])	<0.0005 0-001	<0.0005	<0.0005	<0.0005

Notes:

1. Total metals - samples digested with nitric acid; Total available (acid soluble/extractable) metals - samples acidified with nitric acid to pH <2; Dissolved metals - samples filtered through 0.45µm cellulose acetate and then acidified with nitric acid prior to analysis
2. Metals and salts analysed by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).
3. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
4. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
5. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
6. Analysis conducted between sample arrival date and reporting date.
7. ** NATA accreditation does not cover the performance of this service.
8. ... Denotes not requested.
9. This report is not to be reproduced except in full.

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

checked: .....
Graham Lancaster
Laboratory Manager

Test results from water samples taken from the Big Swamp, 19 June 2018. A pH level of 1.9 is of serious concern, not to mention the Arsenic, Chromium, Aluminium, Iron and Nickel levels.

CONTENTS PAGE

Acid levels in the Big Swamp in 2017	5
Heavy Metals Levels Taken in the Big Swamp June 2018	6
A 1.9 pH level in the Big Swamp	6
INTRODUCTIN	8
Time Line of Events	9
Discussion	10-11
Conclusion	11
Appendix One	
"Finalised Priority Assessment EPBC Listing 2010"	12-13
Appendix Two	
"Hon. Josh Frydenberg letter 2016 – promise made."	14
Appendix Three	
"Area of Impact, including a Reference Area."	15-16
Appendix Four	
"University of Queensland 2018 some listed species.	17-20
Appendix Five	
"Swamp Scrub data."	21-24
Appendix Six	
"2018 Letter to Hon. Sarah Henderson-asking for Help.	25-26
Appendix Seven	
"Australian Grayling in the Otway Ranges."	27-29

INTRODUCTION.

The Australian Federal Government's ***Environment Protection and Biodiversity Conservation Act*** (EPBC) is an act that provides a framework for the protection of the Australian environment, including its biodiversity and its natural and culturally significant places. The Otway Ranges has numerous sites of natural and culturally significant sites.

The Victorian State Government's ***Flora and Fauna Guarantee*** (FFG) is an act designed to protect species, genetic material and habitats, to prevent extinction and allow maximum genetic diversity for perpetuity. The FFG should be applicable to the wide range of genetic diversity found in the Otway Ranges, BUT fails to do so.

A ***Reference Area*** is preserved in its natural state (as far as possible) in perpetuity as a reference because the area is of ecological interest and significance. Such an area can be used as a scientific reference enabling comparative study of modified and unmodified environments. In the middle of the area this document refers to, there is a declared Reference Area that is not being preserved as stated above (See Appendix Three, pages 14-15).

Three Decades of Degradation Continue Unabated.

Residents within the Gellibrand and Gerangamete Groundwater Management Areas have for over three decades, concerns and reservations that those Federal and State Government authorities vested with the implementation of the EPBC and FFG Acts have failed to carry out their responsibilities in stopping devastating environmental degradation from over extraction of groundwater at the Barwon Downs Borefield. This book has a "glimpse" at what has taken place over these last few decades.

Time Line.

During the ***1982-83*** drought extensive groundwater extraction started at the Barwon downs Borefield.
1984 Boundary Creek, a tributary of the Barwon River, stopped flowing for the first time since 1912.
1986 A study conducted determined the Boundary Creek catchment was significant environmentally and had been relatively stable for some considerable time.
1987-90 a stress test pump was conducted at the borefield.
1991 the acid levels in Boundary Creek started to rise.
1995 the results of the stress test pump were published. 1500 ML/year extraction sustainable.
1995 Southern Rural water issued an extraction licence for 12600 ML/Year.
No flow periods in Boundary Creek increased.
1998 A Permissible Annual Volume allowed to be extracted from the borefield was set at 4000 ML/year.
2004 Southern Rural Water renewed the licence for 15 years at a rate of 20,000 ML/Year.
2009 LAWROC Landcare Group nominated aquifer intake areas of the Gellibrand and Gerangamete Groundwater Management Areas to be listed for protection under the *EPBC Act*. Unsuccessful.
2010 LAWROC reapplied and was successful, satisfying the information requirements set out in the EPBC regulations for the nomination of the ***Yeodene and Porcupine Aquifer Intake Areas, Northern Otway Ranges Victoria (including five stream systems with extensive wetlands, springs and native vegetation).*** Nothing came of this as the nomination did not fall high enough on the priority listing (see Appendix One, pages 11-12).
1982-2016 the groundwater extraction has been managed as a mining operation with devastating results. Many of the nominated wetlands, springs and native vegetation have undergone dramatic change.
2016 Sarah Henderson MP Federal Member for Corangamite, referred the groundwater mining operation to the Federal Minister for the Environment and Energy, Josh Frydenberg. MP Frydenberg replied saying resource management is primarily a State responsibility, but thanks for bringing the problem to his attention (see Appendix two, page 13). No follow up as indicated in the Minister's letter has eventuated.
2018 Drawdown impact is spreading into the Gellibrand River Catchment, reducing summer base flows in streams and river and has created a cone of drawdown depression under the township of Kawarren.

Discussion.

As at 2018, there can no longer be any doubt that the 1986 predictions of dire impacts from un-sustainable groundwater extractions, have come to pass. Unfortunately, the impacts manifesting themselves are many times worse than predicted. Even though groundwater extraction stopped in 2010 with a minor extraction in 2016, the impact area continues to spread. The most conservative prediction states it will take the aquifers between 25-70 years (Jacobs 2017) to recover, with no further extraction.

Barwon Water's extraction licence is up for renewal in June 2019. Barwon Water continue to state that the Water Board will be making an application for renewal. The latest indication given, states that it will be for 12,000 ML/year. If this licence is issued Barwon Water will have the capacity to maintain extractions as they have in the past. This cannot be allowed to happen as any promised remediation of impact success depends on the aquifers returning to a natural level. This must be allowed to take place before any further consideration of extraction is given.

Beside the Barwon River drying up every year now (90 days in 2018); despite a 30 km fish kill in 2016 and another fish kill in 2018, and despite a bleak future for the Barwon River, the impact that is spreading into the Gellibrand River Catchment can be slowed and hopefully stopped before the impact creates the same devastation as is presently happening in the Barwon River Catchment. The area of drawdown influence covers a designated Reference Area (see Appendix Three), and huge tracts of Swamp Scrub wetlands and stream systems supporting numerous EPBC and FFG listed species (see Appendix Four, pages 16-19, and Appendix Five, pages 20-23).
In 2009 an application to list the "***Yeodene and Porcupine Creek Aquifer Intake Areas, Northern Otway Ranges Victoria (including five stream systems with extensive wetlands, springs and native vegetation) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act),"*** *successfully satisfied* the information requirements as set out in the EPBC regulations. Unfortunately, the application failed to be placed on the EPBC priority list and the application lapsed (see Appendix One).

In the intervening years the degradation and ever increasing threat to these same stream systems and wetlands has continued unabated. In attempts to slow and stop this degradation the LAWROC Landcare Group continues the "battle" attempting to conduct informative studies on which appropriate resource management can be based. To this end the LAWROC Landcare Group

has asked for help and assistance from Federal Member of Parliament Sarah Henderson (se Appendix Six, pages 24-25).

But unfortunately, without this help and in situations such as this, little is ever done until a catchment becomes so degraded the embarrassment to ALL management authorities reaches such a level that it can no longer be ignored. In the Gellibrand River Catchment scenario the tell-tale signs are there indicating the Gellibrand River system is struggling to maintain its status as one of the iconic areas in the state of Victoria. To enact the provisions stated in the EPBC Act would ensure proactive action would be taken.

Nursery streams such as the Yahoo, Ten Mile, Porcupine and Loves have been the refuge and "engine rooms" producing the biota that replenishes and allows "restocking" to the large streams and rivers. Once these small streams become degraded and flows reduced, the gradual and sometimes catastrophic events have profound impact on the entire catchment and limit the ability of the catchment to regenerate. Colonies of platypus are no longer found in the Yahoo Creek; blackfish kills have now been observed in Loves Creek and summer base flows have been reduced by 50%.

It has been herald as significant that Australian Grayling can still be found in the Gellibrand River Catchment (see Appendix SIX, pages 26-28), but the finding of one juvenile can scarcely be described as a step forward when Grayling observations were, in the past, a regular occurrence. Federal intervention through the EPBC Act is long overdue considering there are numerous EPBC Act listed flora and fauna found in the Gellibrand River Catchment region.

CONCLUSION.

The Federal Government has the basis and the means to intervene in stopping the slow degradation of an iconic region of Australia.

APPENDIX ONE

Australian Government

Department of the Environment, Water, Heritage and the Arts

Mr Malcolm Gardiner
Land and Water Resource Otway Catchment (LAWROC)
1805 Colac Lavers Hill Road
KAWARREN VIC 3249

Dear Mr Gardiner

Finalised Priority Assessment List for the Assessment Period Commencing 1 October 2010

The Department of the Environment, Water, Heritage and the Arts previously wrote to you to advise you that your nomination to list *Yeodene and Porcupine Creek Aquifer Intake Areas, Northern Otway Ranges Victoria (including five stream systems with extensive wetland, springs and native vegetation)* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) had satisfied the information requirements set out in the EPBC regulations.

In accordance with Section 194(G) of the EPBC Act, the Threatened Species Scientific Committee (the Committee) considered all nominations that satisfied the regulations and prepared a Proposed Priority Assessment List (PPAL). The Finalised Priority Assessment List (FPAL) for the assessment period commencing 1 October 2010 has now been determined and is published on the Department's website at www.environment.gov.au/biodiversity/threatened/nominations-fpal.html

Your nomination of the *Yeodene and Porcupine Creek Aquifer Intake Areas, Northern Otway Ranges Victoria (including five stream systems with extensive wetland, springs and native vegetation)* has not been included on the FPAL for the assessment period commencing 1 October 2010. Assessments are prioritised for inclusion on the FPAL based on national significance, quality of information, level of threat, efficacy of existing protection measures and likely conservation benefit.

In considering your nomination, the Committee noted that State legislation and conservation-related tenure has so far proved ineffective at protecting the nominated aquifer intake areas. However, information about this ecological community was considered insufficient to enable an assessment to be completed under the EPBC Act. Importantly, there is lack of clarity about what is the ecological community and its national extent. Therefore the Committee determined that a greater conservation benefit would be achieved by directing resources to other nominations for the 2010 assessment period.

INVESTOR IN PEOPLE

GPO Box 787 Canberra ACT 2601 Telephone 02 6274 1111 Facsimile 02 6274 1666
www.environment.gov.au

MEMBER

This nomination has been considered twice by the Committee and will not automatically be eligible for consideration in the next assessment round as the EPBC Act provides for nominations to be considered for only two consecutive periods.

Thank you for your nomination and interest in conserving Australia's unique biodiversity.

Yours sincerely

Deb Callister
A/g Assistant Secretary
Wildlife Branch
30 September 2010

APPENDIX TWO

RECEIVED
DATE 19/12 BY

THE HON JOSH FRYDENBERG MP
MINISTER FOR THE ENVIRONMENT AND ENERGY

MC16-018230

Ms Sarah Henderson MP
Member for Corangamite
3A/195 Colac Road
WAURN PONDS VIC 3216

16 DEC 2016

Dear Ms Henderson

I refer to your letter concerning groundwater extraction activities by BarwonWater for their Barwon Downs borefield located near Colac, Victoria.

Matters relating to resource management are primarily the responsibility of state and territory governments. The Australian Government regulates proposals that significantly impact on matters of national environmental significance protected by the *Environment Protection and Biodiversity Conservation Act 1999* (the Act).

The Act provides an exemption for the lawful continuation of an activity that was ongoing prior to the commencement of the legislation in July 2000. This means that only new or expanded water extraction activities that have, will have, or are likely to have a significant impact on a matter of national environmental significance must be approved under the Act.

I have asked the Department of Environment and Energy (the Department) to investigate whether water extraction activities have, or are likely to have, a significant impact protected matters in the region. You can read more about how the Department manages compliance activities in their policy at: www.environment.gov.au/epbc/publications/epbc-compliance-and-enforcement-policy.

Thank you for bringing the 'Land and Water Resources Otway Catchment' landcare group's concerns to my attention.

Yours sincerely

JOSH FRYDENBERG

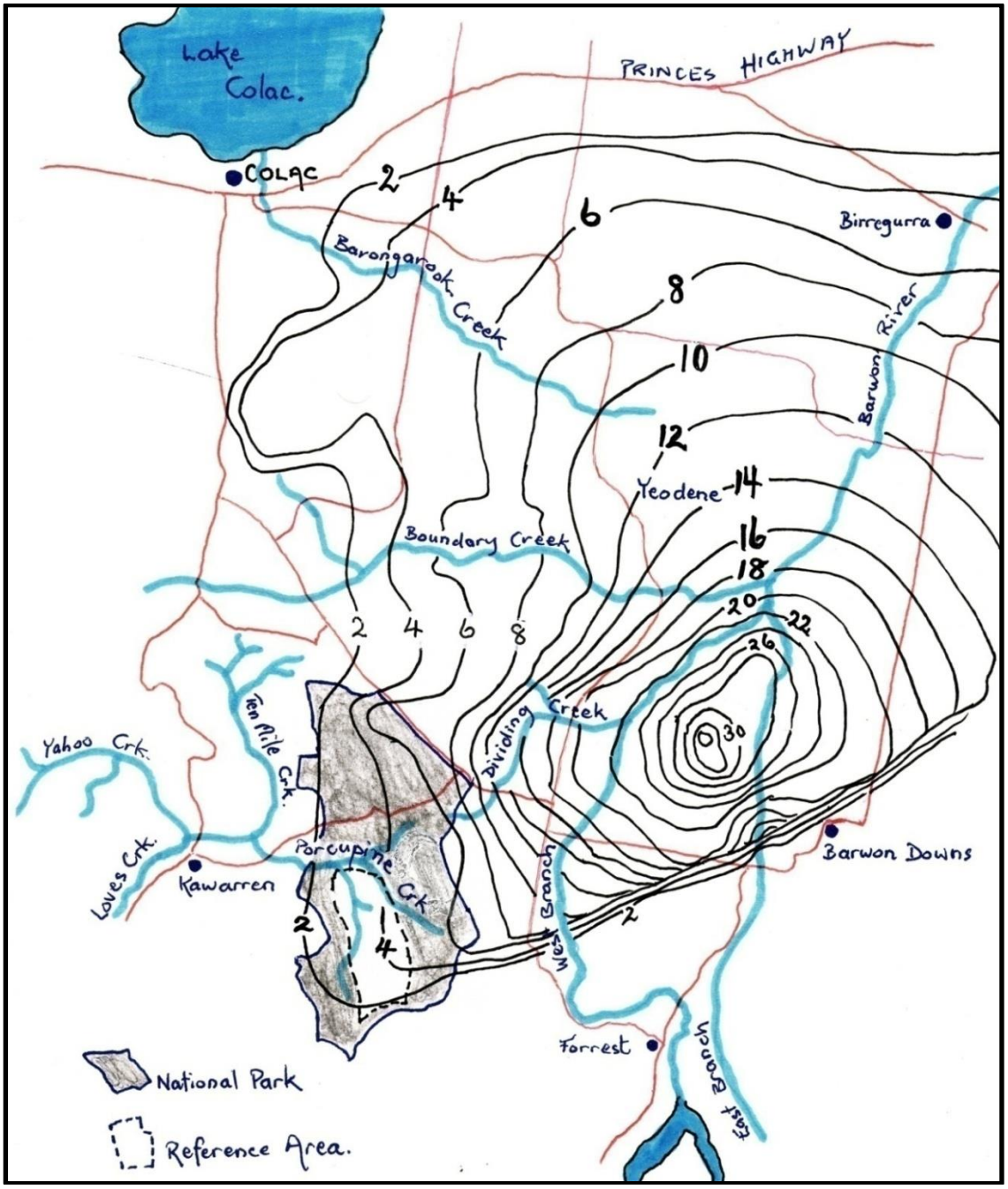
Parliament House Canberra ACT 2600 Telephone (02) 6277 7920

APPENDIX THREE

Porcupine Creek Reference Area – Swamp Scrub, Wet Health and Sedgy Riparian Woodland.

Porcupine Creek Reference Area.

Groundwater Drawdown Contours as at June 2007. Unfortunately, under the 2004 licence conditions Barwon Water does not have to provide the drawdown contour figures out to zero. Tis is still the case as at Decmeber 2018.



Map Source: Barwon Water handout earlt 2000s.)

APPENDIX FOUR

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

School of Earth and Environmental Sciences

11th August, 2018

Dear Land and Water Resources Otway Catchment Landcare Group,

The following EPBC-listed species have already been or are very likely to be affected by unsustainable groundwater extraction from the Barwon Downs well field:

Eastern dwarf galaxias (*Galaxiella pusilla*)

Habitat for this species is known to occur in the affected area. Populations in the affected area are a management priority given their isolation from other populations within this species' range. The species is listed as Vulnerable under the Australian Government Environment Protection and Biodiversity Conservation Act 1999, and is also designated as Vulnerable on the IUCN Red List of Threatened Animals (IUCN 2003) and on the Australian Society for Fish Biology threatened species list (ASFB 2001). In Victoria the dwarf galaxias is listed as Threatened under the Victorian Flora and Fauna Guarantee Act 1988. This species has suffered a significant decline in abundance due to habitat changes to shallow freshwater wetlands. The decline of this species appears to be continuing, as several populations have become extinct in recent decades. Distribution of populations is now generally disjunct and patchy, due to the fragmented nature of the remaining lowland shallow freshwater wetland habitat. Major threats to the dwarf galaxias include wetland drying, climate change and habitat damage through a lack of regeneration. Changes to natural flood and drying cycles, particularly in swamps and shallow creeks, through activities such as catchment clearing and direct abstraction of water, pose threats to dwarf galaxias habitat. These activities may alter natural seasonal water levels at critical times of the year or may result in complete loss or permanent alteration of wetland habitats. Changes in the level of local water tables may also affect the hydrology of swamps and the ability to seek refuge in crayfish burrows – a critical shelter habitat for the species. There is a National Recovery Plan for the dwarf galaxias managed in Victoria by the Department of Sustainability and Environment. The Plan's objectives include: to identify and manage potentially threatening processes impacting on dwarf galaxias conservation; and to protect key populations across the range of the dwarf galaxias. The previous and planned unsustainable groundwater extraction from the Barwon Downs well field are in immediate conflict with both of these objectives.

Australian greyling (*Prototroctes maraena*)

Habitat for this species is known to occur in the affected area. The species has been listed as Vulnerable under the Australian Government Environment Protection and Biodiversity Conservation

•

Act 1999. Factors contributing to the decline of this species include altered flow and temperature regimes and increased nutrient and sediment loads. With its relatively short life span, most individuals spawn only once before they die, so populations are especially vulnerable to any disruption of spawning or recruitment. Groundwater extraction alters natural flows, which has the effect of reducing the frequency and extent of natural flooding in winter and spring, and often increasing flows in summer, when stored water is released for irrigation. Australian grayling appear to be dependent upon flooding to spawn, requiring a rise in water levels, possibly coupled with a decrease in water temperatures, to initiate spawning. When flooding does not occur during the spawning season, females resorb their ovaries and do not spawn (O'Connor & Mahoney 2004). Bishop and Bell (1978) recorded the death of many Australian grayling due to sudden cessation of flows. Reducing and altering the seasonality of river flow through direct pumping can directly affect adults as well as reducing reproductive potential and recruitment. Missing a spawning season could have major consequences for a species that may spawn only once or twice in its entire life. Poor water quality, including altered temperature regime (thermal pollution), reduced dissolved oxygen, increased heavy metals and toxins, has resulted from excessive groundwater extraction from the Barwon Downs bore well. Fish kills can result from these conditions, and species such as Australian grayling may avoid or not recolonise areas of sustained poor water quality. The Recovery Plan for the Australian greyling states the human activities with the potential to have detrimental impact on the Australian grayling include: reduction in/alteration of river flows (especially winter flows), through abstraction of more water from the system; and removal/degradation of riparian vegetation/habitat. Both of these impacts have resulted from excessive groundwater extraction from the Barwon Downs bore well. Fundamental to the success of the Australian greyling Recovery Plan is maintaining or restoring environmental flows in habitat for this species.

Yarra pygmy perch (*Nannoperca obscura*)

This species is known to occur in the affected area. Populations in the affected area are a management priority given their isolation from other populations within this species' range. The species is listed as Vulnerable under the Australian Government Environment Protection and Biodiversity Conservation Act 1999, and is also designated as Vulnerable on the IUCN Red List of Threatened Animals (IUCN 2003) and on the Australian Society for Fish Biology threatened species list (ASFB 2001). In Victoria the Yarra Pygmy Perch is listed as Threatened under the Victorian Flora and Fauna Guarantee Act 1988. It is likely that the species has suffered a significant decline in abundance due to habitat changes to rivers, creeks and shallow freshwater wetlands. This decline appears to be continuing, with at least three populations apparently becoming extinct in recent decades. Major threats to the Yarra pygmy perch include wetland drainage, climate change and habitat damage through a lack of regeneration. The Yarra pygmy perch is a short-lived species and probably has poor dispersal ability. The fragmented and patchy nature of its remaining habitat across the landscape, and variability of this habitat between seasons and years, makes the species extremely vulnerable to local extinctions. Reduced flooding and loss of habitat linkages greatly reduce the ability to recolonise habitats. Appropriate hydrological conditions that regularly replenish the shallow freshwater habitats are essential for the survival of the Yarra pygmy perch, and the natural degree of wetland connectivity to a more permanent waterbody (such as river or creek) may also be vital to their long-term survival (particularly during extended dry conditions). Changes to natural flood and drying cycles, particularly in swamps and shallow creeks through the direct abstraction of water pose a threat to Yarra pygmy perch habitat. These activities may alter natural

seasonal water levels at critical times of the year or may result in complete loss or permanent alteration of wetland habitats. Changes in the level of local water tables may also affect the hydrology of swamps and smaller flowing waters. Populations occurring in smaller creeks on land where grazing is practiced (constituting the majority of known sites) are particularly susceptible to water abstraction. The Recovery Plan for the Yarra pygmy perch objectives include: to identify and manage potentially threatening processes impacting on Yarra pygmy perch conservation; and to protect key populations across the range of the Yarra pygmy perch. The previous and planned unsustainable groundwater extraction from the Barwon Downs well field are in immediate conflict with both of these objectives.

Growling grass frog (*Litoria raniformis*)

This species is known to occur in the affected area. The growling grass frog is listed as Vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). It is also listed as Threatened in Victoria (Flora and Fauna Guarantee Act 1988). Current threats include habitat loss and degradation. The growling grass frog is reliant on aquatic and riparian habitats and specific hydrological regimes for breeding and the subsequent development of the larval stage. Loss, modification, degradation and fragmentation of aquatic and adjacent terrestrial habitats are likely to have had a considerable adverse impact on the species. As a relatively mobile species that relies on movement between waterbodies to maintain the integrity of populations, it is also vulnerable to loss of habitat and connectivity between breeding and non-breeding habitats. Alterations to the timing, frequency and extent of flooding events have resulted in dramatic changes to many natural processes, such as preventing or greatly reducing spring flood events across natural floodplains. Cold water releases from impoundments have had a considerable impact on downstream ecological processes and native fish populations (MDBC 2003), and are likely to adversely affect the development rates and survivorship of growling grass frog eggs and tadpoles. The reduction of inflows to wetlands is having a detrimental impact on these habitats in areas occupied by the growling grass frog. In particular, piping and channelling of water increases the efficiency of water transport and directs water away from wetland habitat. One of the specific objectives of the growling grass frog recovery plan is to: address known or predicted threatening processes, and implement appropriate management practices where possible to ensure that land use activities do not threaten the survival of the Southern Bell Frog. The previous and planned unsustainable groundwater extraction from the Barwon Downs well field are in immediate conflict with this objective.

A suite of other very rare or EPBC-listed species are likely to or may have habitat within the affected area and may be affected by unsustainable groundwater extraction from the Barwon Downs well field, namely;

- Showy Lobelia (*Lobelia beaugleholei*)
- Spiral Sun-orchid (*Thelymitra matthewsii*) – Vulnerable (EPBC Act 1999)
- Maroon Leek-orchid (*Prasophyllum frenchii*) – Endangered (EPBC Act 1999)
- River swamp wallaby-grass (*Amphibromus fluitans*)– Vulnerable (EPBC Act 1999)
- Golden sun moth (*Synemon plana*) - Critically Endangered (EPBC Act 1999)
- Swamp Antechinus (*Antechinus minimus maritimus*) – Vulnerable (EPBC Act 1999)

- Spot-tailed quoll (*Dasyurus maculatus maculatus*) – Endangered (EPBC Act 1999)
- Southern brown bandicoot (*Isoodon obesulus*) – Endangered (EPBC Act 1999)
- Broad-toothed rat (*Mastacomys fuscus mordicus*) – Vulnerable (EPBC Act 1999)
- Long-nosed potoroo (*Potorous tridactylus tridactylus*) – Vulnerable (EPBC Act 1999)

Information for this report was drawn almost exclusively from the following Recovery Plans prepared under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999:

Backhouse, G., Jackson, J. and O'Connor, J. 2008a. National Recovery Plan for the Australian Grayling Prototroctes maraena. Department of Sustainability and Environment, Melbourne.

Clemann, N. and Gillespie, G.R. 2012. National Recovery Plan for the Growling grass frogLitoria raniformis. Department of Sustainability and Environment, Melbourne.

Saddlier, S, and Hammer, M. 2010. National Recovery Plan for the Yarra Pygmy Perch Nannoperca obscura. Department of Sustainability and Environment, Melbourne.

Saddlier, S., Jackson, J. and Hammer, M. 2010. National Recovery Plan for the Dwarf Galaxias *Galaxiella pusilla*. Department of Sustainability and Environment, Melbourne.

Other literature cited:

Bishop, K.A. and Bell, J.D. 1978. Observations on the fish fauna below Tallowa Dam (Shoalhaven River, New South Wales) during river flow stoppages. Australian Journal of Marine and Freshwater Research 29: 543-549.

MDBC. 2003. Native Fish Strategy for the Murray-Darling Basin 2003-2013. MDBC Publication No 25/904. Murray-Darling Basin Commission, Canberra.

O'Connor, J. and Mahoney, J. 2004. Observations of ovarian involution in the Australian grayling (Prototroctes mareana). Ecology of Freshwater Fish 13: 70-73.

Yours sincerely,

Sean Maxwell

School of Earth and Environmental Sciences

The University of Queensland

APPENDIX FIVE.

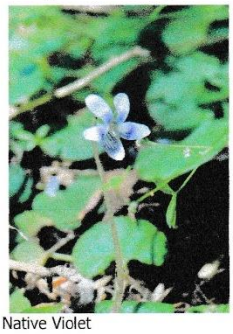
What is Swamp Scrub?

Swamp Scrub is a distinct ecosystem formed by an assemblage of plants growing together to form a vegetation community.

- Woolly Tea Tree is the dominant species often forming a dense, impenetrable thicket. Other signature Swamp Scrub species include; Scented Paperbark, Tall Saw Sedge and Tassel Sedge.
- Swamp Scrub grows on wet, swampy sites, near springs, along rivers and in damp gullies and wetlands in Southern Victoria and South Australia.
- The understorey in dense and includes large sedges and many small plants including grasses, herbs, mosses and lichens. Common species include Ivy-leaf violet, Shiny Bog-Sedge and Streaked Arrow Grass.
- Swamp Scrub usually looks blue/grey, making it easy to recognise from a distance.


Woolly Tea Tree

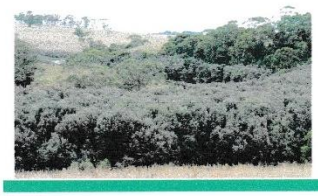
Why is Swamp Scrub important?


Native Violet

Swamp scrub provides many services including:

- healthy fish habitat
- preventing erosion and soil loss into waterways
- filtering excess nutrients
- improving water quality for human and stock use
- Habitat for useful pollinators and native predators, including birds, that eat farm pests such as Cockchafer Beetle larvae
- Shade, windbreaks and shelter for stock and pastures
- Habitat for native wildlife including several threatened species
- Only known habitat for three threatened orchid species

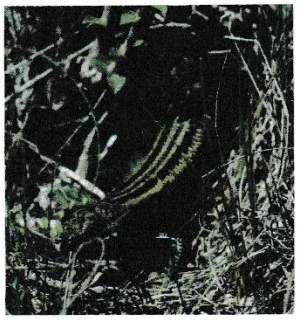
Only five percent of the Swamp Scrub present at European settlement remains in Victoria. Like all native vegetation Swamp Scrub is important to help buffer the region against a changing climate and to ensure the long term viability of our farms and landscape.



Left: Swamp Scrub on the Curdies River and a Swamp Antechinus

What lives in Swamp Scrub?

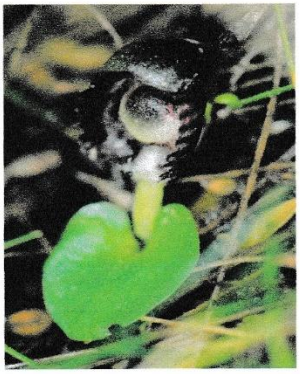
Many native animals live in or use Swamp Scrub. Many of these are rare or threatened, including the Swamp Antechinus, Ground Parrot, Southern Emu Wren, Orange Bellied Parrot, Growling Grass Frog, Swamp Skink and Yarra Pigmy Perch. These and Eels, Spiny Crayfish, possums and a variety of birds all depend on Swamp Scrub in some way.



Swamp Skink

By looking after Swamp Scrub we are protecting vital habitat for many species. We want to make sure the plants, birds and other animals we encounter will still be visited by future generations.

Swamp Scrub not been extensively studied and contains several un-named plant species. Who knows what wonderful new products, foods or medicines could be discovered.



Late Helmet Orchid

Native Orchids

Native orchids, including at least three threatened species grow in Swamp Scrub. These orchids need specific conditions to grow and reproduce. Swamp Scrub provides the right combination of soil moisture, specific soil fungus and light. Because orchids are so sensitive they are an indicator of a healthy system.

The Late Helmet Orchid grows only in Swamp Scrub. These beautiful, tiny plants have a flower that is just 15mm long. We know of only six places in the world where this species grows. Including four spots here in South West Victoria.

The Swamp Greenhood Orchid and the Small Sickle Greenhood Orchid also grow in swamp scrub. They can grow to 30cm tall and both produce a single white flower with green stripes.

Swamp Greenhood

In recent years there has been a huge effort put in to managing threatened orchids. Research into orchid biology, pollinations and genetics is being done by DSE and other agencies. Hands on management includes pollinating small populations by hand, weed control and growing some orchids in laboratories and planting them back into the wild. Volunteers play a crucial role in threatened species conservation and orchid conservation in particular.

How you can help

If you have Swamp Scrub on your property we might be able to provide funding and assistance to help you manage it. This could include fencing to manage stock access or controlling weeds. We are also interested in surveying Swamp Scrub sites, even degraded sites or sites that are already fenced, so please contact us for more information.

For more information contact: Laura Weedon: Threatened Species Officer
Ph: 5561 9962, Mobile: 0437 854 690, laura.weedon@dse.vic.gov.au.
Becky McCann Heytesbury District Landcare Network: 0409842471

Swamp Scrub threatened species

Swamp Greenhood – *Pterostylis tenuissima*

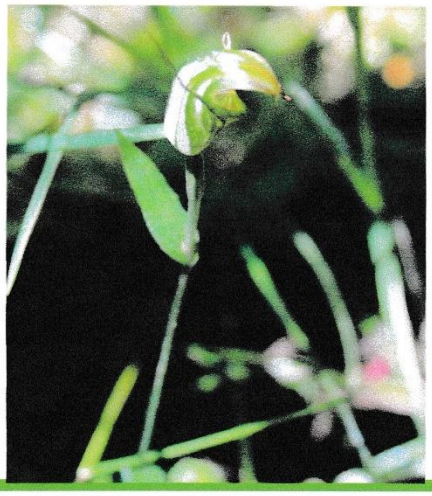
Series No 2

Description

The Swamp Greenhood Orchid is tiny and quite hard to spot.

A single translucent white flower with green stripes sits on top of a fine green stem. Several pointy leaves hug the stem, which can grow up to 30 cm tall but is usually much shorter. Flowers are up to 20mm long and appear at any time of year but most commonly in summer.

Plants have either basal leaves or flowering stems. Glossy dark green, almost round, leaves up to 20 mm long form the basal rosettes of non-flowering plants.



Habitat

Swamp Greenhoods are only found in the dark, dense, wet habitat of the aptly named Swamp Scrub. Swamp Scrub is dominated by dense stands of Woolly Tea Tree and Scented Paperbark. Swamp Greenhood grows in the open understorey beneath this dense canopy along with a huge diversity of grasses, sedges, herbs, moss and fungi. It is sometimes found on or beside animal tracks through the Swamp Scrub.

Orchids are rarely found in the closed areas of understorey dominated by dense Gahnia (Saw Sedge).

Swamp Scrub occurs on frequently wet sites along waterways, springs and drainage lines. It is easily recognisable by the grey-blue hue of the Woolly Tea Tree. Swamp Scrub grows on a variety of soil types from organic loam to fine silts and peat soils.

Distribution

The distribution of this orchid is limited by the distribution of its habitat. Swamp Scrub is now restricted to approximately five percent of its former area. Populations of Swamp Greenhood occur in areas of South West Victoria, including along the Curdies River from Cobden to Peterborough, on the Gellibrand River at Princetown and at Nelson and Portland.

Further east it occurs at Wilson's Promontory. It also occurs in several spots in South Australia.

Victoria
The Place To Be

Swamp Greenhood – *Pterostylis tenuissima*

Conservation status

The Swamp Greenhood Orchid is listed as vulnerable under Australia's national threatened species legislation; the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). This means that the Swamp Greenhood is considered nationally significant. Any action that may impact on this species should be referred to the Federal Government. This species is considered vulnerable in Victoria.

Decline and threats

The major threat to this orchid is the decline in area and quality of its habitat. The five percent of Swamp Scrub that remains in Victoria is fragmented into numerous small patches. Many of these small patches are being further degraded by exposure to wind, grazing stock, drainage and weed invasion. The impacts of a drying climate are unknown but it is expected that wet areas may dry out, further reducing available habitat.

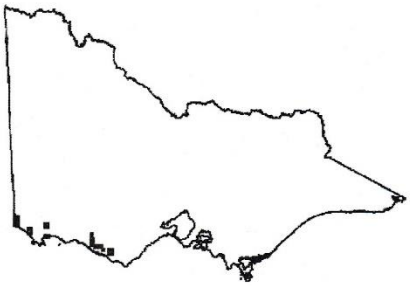
Conservation actions

The majority of Swamp Greenhooods grow on privately owned land. Farmers and other landholders play a major role in protecting this species. Many landholders have protected the Swamp Scrub habitat on their properties by limiting or excluding stock access and controlling weeds.

Private landowners also generously assist with research and monitoring by allowing surveys to be conducted on their land. Financial and other assistance is available for landholders who want to manage Swamp Scrub on private land.

Threatened species staff and volunteers regularly monitor selected populations of Swamp Greenhoood. This helps us to get a better understanding of the ecology and habitat requirement of this species. It also allows us to monitor the impact our conservation management actions have on these populations.

We collect seed from the larger, healthier populations for long term storage in the Millennium seed bank and for research into propagation. The seed bank is an insurance policy against catastrophic loss of populations in the wild.



Above: present distribution of late Swamp Greenhood

You can help our threatened species:

- Contact us to report sightings of any of these species.
- Refrain from illegally collecting wildflowers.
- Get involved and volunteer with your local Field Naturalists, 'Friends', Landcare or Coastcare Group

For more information regarding threatened species and current projects in southwest Victoria, visit http://swifft.bird.net.au/

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For more information contact Laura Weedon Threatened Species and Swamp Scrub Project Officer, Warrnambool on 0437854 690 or 03 5561 9962, laura.weedon@dse.vic.gov.au

www.dse.vic.gov.au

APPENDIX SIX.

To:
Sarah Henderson
Federal Member of Parliament
for Corangamite.
3rd December 2018

Hello Sarah,
This LAWROC pdf has been prepared on behalf of those people supporting the endeavours of the LAWROC Landcare Group executive.

The aim of this document is an attempt to gain funds to continue the pursuit of informative information on which future natural water resource management decisions in the Otway Ranges can be made.
The focus being on:

1. an area of drawdown impact created from groundwater extraction at the Barwon Downs Borefield that now extends into the Gellibrand River Catchment,
2. the concerns of over 750 people living along and reliant on water from the Gellibrand River Catchment,
3. 35,000 people from towns in the Western district who rely on the water resources extracted from the Catchment, and
4. an aquifer drawdown cone of depression that has been created under the township of Kawarren.

The funding required:

- $15,000 to engage an independent hydrologist to investigate the connection between drawdown impact in the Kawarren region and groundwater extractions from the Barwon Downs Borefield, with a specific emphasis on the Yahoo Creek.
- $10,000 to test for Potential and Actual Acid Sulfate Soils. To map these peat wetland soils within the catchment.
- $10,000 to undertake intensive fish surveys in the Yahoo Creek Catchment and compare the results with the Zampatti studies of the early 1990s.
- $5,000 to prepare recommendations based on these works.

- to provide these recommendations to ALL relevant government authorities that then should determine the development and implementation of sound natural resource water management.

Community Concerns.

1. In the 1990s the Yahoo Creek supported platypus colonies and was found to have one of the most diverse collection of fish species in the Otway Ranges. This does not appear to be the case any longer.
2. With a June 2018 eDNA testing the platypus colonies have been shown to have disappeared.
3. Downstream of the confluence with Loves Creek dead blackfish have been found. This is unheard of.
4. Summer base flows in Loves Creek have been reduced by 50%.
5. Loves Creek has been reported as a losing stream, no longer a gaining stream.
6. Large areas of peat wetlands (estimated 1,000 hectares in the Gellibrand River Catchment) have not been mapped or investigated for Acid Sulfate Soils.
7. Those small pockets of peat wetlands (Swamp Scrub) that LAWROC has investigated contain Potential Acid Sulfate Soils. Our concern is that Swamp Scrub wetland sites will dry out creating Actual Acid Sulfate Soil flushes of acid and heavy metal water.

As a community with a reputation for conducting cost effective and sound research we ask you, Sarah, that you kindly look at this proposal.

Thanks in anticipation.

Tricia Jukes,
President of the LAWROC Landcare Group,
Colac Lavers Hill Road
Victoria 3249.
Phone (03) 52 358 298

APPENDIX SEVEN.

Colac Herald 19/08/2011

Grayling found in Otways

by Alex White

A rare fish discovery in the Otways has renewed hope that threatened fish populations in the region are resurging.

Scientists recorded an Australian grayling in the Gellibrand River at Black's Bridge, indicating the species might be returning to the area's waterways.

It's the first grayling officially recorded in the catchment since scientists started keeping records in the early 1980s and follows a Corangamite Catchment Management Authority worker taking a photo of a grayling last year.

CCMA senior river health officer Denis Lovric said the discoveries were a positive sign that efforts to boost endangered native fish populations in Corangamite's waterways were working.

In the past decade the Corangamite CMA has addressed 10 barriers impeding fish migration in the Gellibrand catchment, opening up more than 230 kilometres of the waterway, excluding its tributaries.

It has also completed more than 100 kilometres of river restoration works in the catchment, including planting native vegetation, willow removal and fencing to help improve water quality.

The CCMA will do sampling again this summer and Mr Lovric said his team hoped there were more Australian graylings, along with other native fish.

"The one caught was a juvenile, which means they're recruiting, probably in low numbers, but we think it means they're breeding, which is really good," he said.

Scientists surveyed 60 different sites along the Gellibrand River and captured 14 fish species, 13 of which were native with the brown trout the only introduced species.

Mr Lovric said four species were common to anglers but the other 10 native species remained mostly unknown to the general public.

SITE: The rare fish was found in the Gellibrand River at Black's Bridge.

Australian grayling

POSITIVE: Corangamite Catchment Management Authority senior river health officer Denis Lovric says rare fish discoveries in the region are a boost for the authority.

19/8/11

CCMA 2011-12 Projects Doc.

Managing Our Great Ocean Road Estuaries

Case Study

Rare fish discovery in the Gellibrand River

The discovery of a rare Australian Grayling in the Gellibrand River gives hope that threatened fish populations in Corangamite's rivers are rising.

Scientists have recorded a Grayling in the Gellibrand River sparking hope of their return to the region's waterways.

It's the first Grayling officially recorded in the catchment since scientists started keeping records in the early 1980s and follows a photo taken of a Grayling by a Corangamite CMA staff member last year.

Corangamite CMA senior river health officer Denis Lovric said the discoveries were a positive sign that efforts to boost endangered native fish populations in Corangamite's waterways were working.

In the past decade the Corangamite CMA has addressed 10 barriers impeding fish migration in the Gellibrand catchment, opening up more than 230 kilometres of the waterway, not including its tributaries.

It has also completed more than 100 kilometres of river restoration works in the catchment, including planting native vegetation, willow removal and fencing to help improve water quality.

Sampling will take place again this summer and Mr Lovric said his team hoped there were greater numbers of the Australian Grayling, along with other native fish.

"The one caught was a juvenile, which means they're recruiting, probably in low numbers, but we think it means they're breeding which is really good," he said.

Scientists surveyed 60 different sites along the Gellibrand River and captured 14 fish species, 13 of which were native. The Brown Trout being the only introduced species.

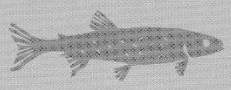
Four species, the Brown Trout, River Blackfish, Short-finned Eel and Tupong, are common to anglers but the other 10 native species remain largely unknown by the general public.

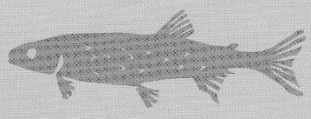
Mr Lovric said Corangamite CMA staff had been buoyed by the results of willow removal and revegetation work after noticing greater numbers and diversity of fish in areas cleared of willows, which choke waterways.

He said results of the Gellibrand River fish study had the potential to raise the national significance of the Gellibrand River.

"It shows our work may have contributed to reintroducing the species to the river. But the other important thing is it should elevate the status of the river if there's threatened species living there," Mr Lovric said.

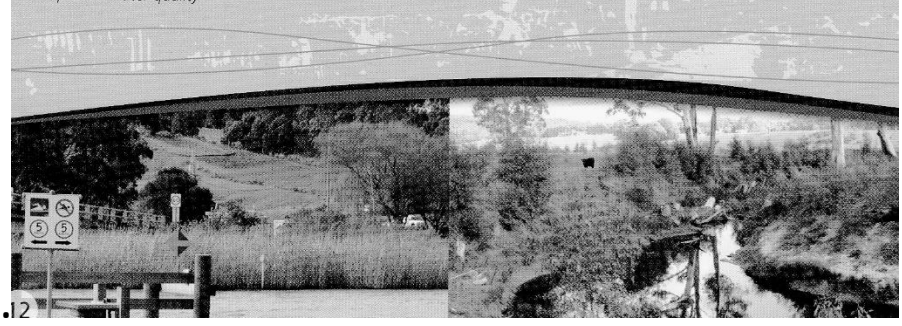
The Corangamite CMA plans to address another two barriers to fish passage this summer.





Below left: EEMSS is used to manage estuary mouth

Below right: Fencing and revegetation on the Gellibrand River has improved water quality



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Australian Grayling.