Kalbar Fingerboards Heavy Mineral Sand Project

Environmental Effects Survey Submission 457.

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WOODWARD SUBMISSION – 457 –

Committee members we'd like to start this hearing by paying our respects to the Gurnai Kurnai people, to their elders past present & emerging. We would like to let all those present and emerging who have gone on record as strongly opposing this mine - we stand with them! Just as the people of the Murray darling stand with their traditional land owners, we stand with ours - to quote our First Nations people – When Country is happy, our spirits are happy.

Members, not only would The Mitchell River benefit from the withdrawal of Kalbar's operation, but separately the reduction of Southern Rural Waters allocations of water to big irrigators, whilst we realise this is out of the realm of an IAC's scrutiny, it is certainly worth flagging in the context of our submission.

- As aforementioned in our (previous) submission:

'Kalbar reducing the Mitchell River's fresh water flow during critical 'dilution flow' periods & removing 3-4 gigalitre (GL) of water per annum will: hinder the rivers salinity flushing process; extend highly fragile salinisation periods; and increase (& prolong) already high *downstream* salinity time frames to dangerous levels'.

Our family's farm is not the only 'downstream' section of the river affected by salinity, nor will we be the only people affected by fresh water issues into the future.

In 2007 the Howard government created one of our greatest achievements toward legislating water in our Nation - the '2007 Water Act'. Throughout this ACT it lay a clear caveat toward it's scheme – Take only what you need
The ultimate quantitative control imposed by the Water Act is the 'sustainable diversion limit' or an (**SDL**), this is intended to cap the volume of water taken for consumptive use, such as for irrigated agriculture, and mining – The water taken 'must reflect an environmentally sustainable level of take' an (**ESLT**).

Environmentally sustainable level of take for a water resource means "the level at which water can be taken from the Mitchell River, and, if exceeded would compromise the following":

(a) key environmental assets of the water resource (Like Sandy points); or

(b) key ecosystem functions of the water resource (Like Black bream & Platypus); or

(c) the productive base of the water resource; or

(d) key environmental outcomes for the water resource (Like flushing of Salinity.)

We would say, from observing as many of the IAC's online video submissions as we could, every one of these points have been argued as 'compromised' - we ask you to consider this.

Climate Distortion

An opening level of concern here is Kalbar's 'negligent' interpretation of climate data - An 'environmentally sustainable level of take' cannot be sustainable if it is not accurate.

Much like it's decision to make last minute changes to claw back water through centre-refuges, Kalbar attempt to amend this in Technical Note 37, However it's entire modelling system is still based on climate 'projections' that (only) start at the end of the CSIRO's & DEWLP's projected 2030 or 2040 periods (see table 7-1) but do not included any climate impact prior to 2030 or 2040. The entire EMM model "assumes" CSIRO data has no change over the prior period. 2016 – 2037 (See table 1, Page 2)

Throughout Kalbar's report *'Appendix A - Ground Water & Surface Water Impact Assessment - Conceptual Surface Water Management Strategy & Water Balance'* we see modelling based on the following narrative -

Quote: "The operational phase of the project will extend for approximately 15 years. Both DELWP (2016) and CSIRO (2015) agree the following general changes in climate are expected by the end of this period (by 2030-2040): Unquote

Kalbar reference both the DELWP and CSIRO data in their submissions but do not identify which of these data have been leveraged within their model. We feel their submission understates the impact that climate change is already having on the river. If the effects of climate change are even slightly more pronounced than predicted by Kalbar's model, the river and the ecosystems that depend upon it could face irreparably damage.

Table 7-1

Table 7-1 Comparison of climate change projections (climate scenario RCP8.5)

	DELWP (2016)[2]			CSIRO (2015)		
Parameter	**10th percentile**	**50th percentile**	**90th percentile**	**10th percentile**	**50th percentile**	**90th percentile**
Location	Mitchell River basin			Southern Slopes - Victoria East		
Baseline period	1975-2014			1986-2005		
Projection year	2040			2030		

Table 7-1 Comparison of climate change projections (climate scenario RCP8.5)

	DELWP (2016)[2]			CSIRO (2015)		
Parameter	**10th percentile**	**50th percentile**	**90th percentile**	**10th percentile**	**50th percentile**	**90th percentile**
Temperature (°C)	1	1.3	1.5	0.5	0.8	1.1
PET (%)	3.1	4.7	5.7	2.2	4.3	6.1
Rainfall (%)[1]	4.3	-2.3	-9.7	5	-1	-8
Runoff (%)[3]	10.4	-11	-26.3	Approx. 0	Approx. -10	Approx. -20

Notes:

1. DELWP (2016) presents 10th percentile rainfall projections as 'wetter' conditions, while CSIRO (2015) presents 10th percentile as 'dryer' conditions.
2. Climate change projections represent a low (10th percentile), medium (50th percentile) and high (90th percentile) impact on water availability from climate dependent sources.
3. CSIRO (2015) reports a decrease in runoff as *high confidence* but recommends that further hydrological modelling would be required to develop reliable runoff statistics

To further supports this, Kalbars environmental engineer, Jarred Muller (YouTube Fingerboards IAC hearing May 6th 2021) insinuated - Early projections do not matter, as the life of the mine will have expired by the time climate change becomes relevant - having gone on the record as saying: "Due to the relatively short duration of the project, *about* 15 years' climate change was considered only in a context of a 15-year layout at the end of mining, *roughly* aligning with year 2040 projections". – We strongly disagree - Climate change should not only be considered for the 25-year period of mining it should be considered from the very start of the projects Greenfields inception.

Let's give there statement a chance though - Hypothetically - assuming Kalbar's proposal is granted and at best civil works begin early next year (2022), assuming there are zero Covid delays, the project gets classed as an 'essential service' (if future lockdowns occur) and, a local workforce is sourced (as promised) all within a 6-month window, then with this perfectly on time 2037 end date – are we really to believe the CSIRO's projection data is accurately represented by Kalbar? That Kalbar's modelling is accurate for not including any climate change warming, declining rainfall & river flow data projections because of Kalbars modelling understatement.

It appears Kalbar have made two mistakes regarding data input–

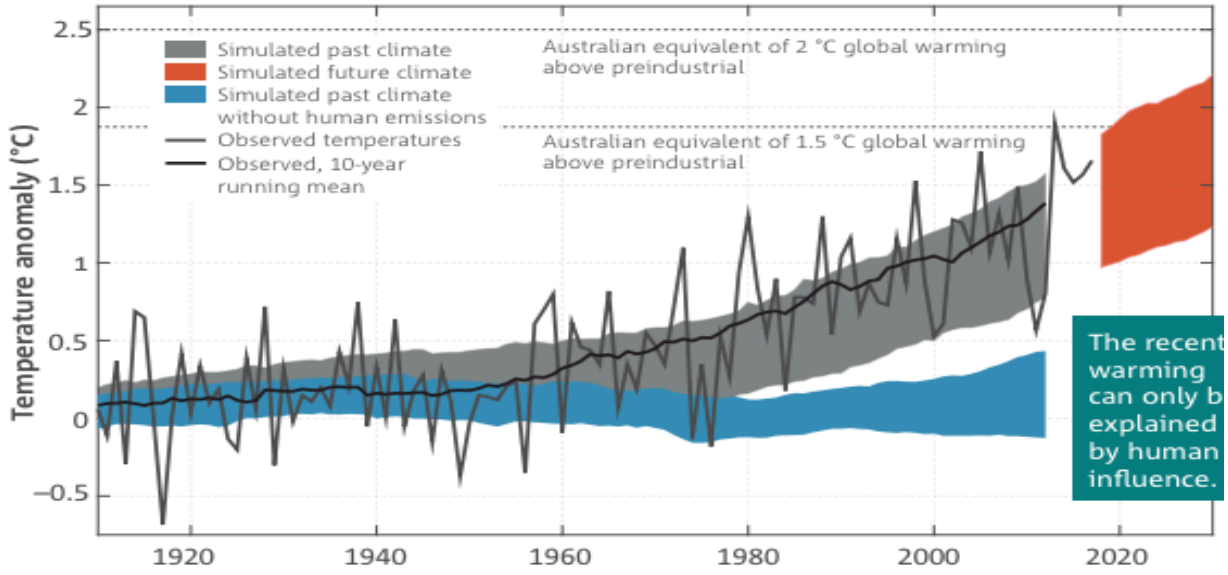
- 1 - The data sets being used to model climate change were produced in the year 2015 (CSIRO) & 2016 (DEWLP) – And although having recently replied to questions directed by the IAC (appealing for more up to date science) - Technical note TN037 - EMM make the following alterations when applying the industry standard RCP 8.5 climate model – they say:

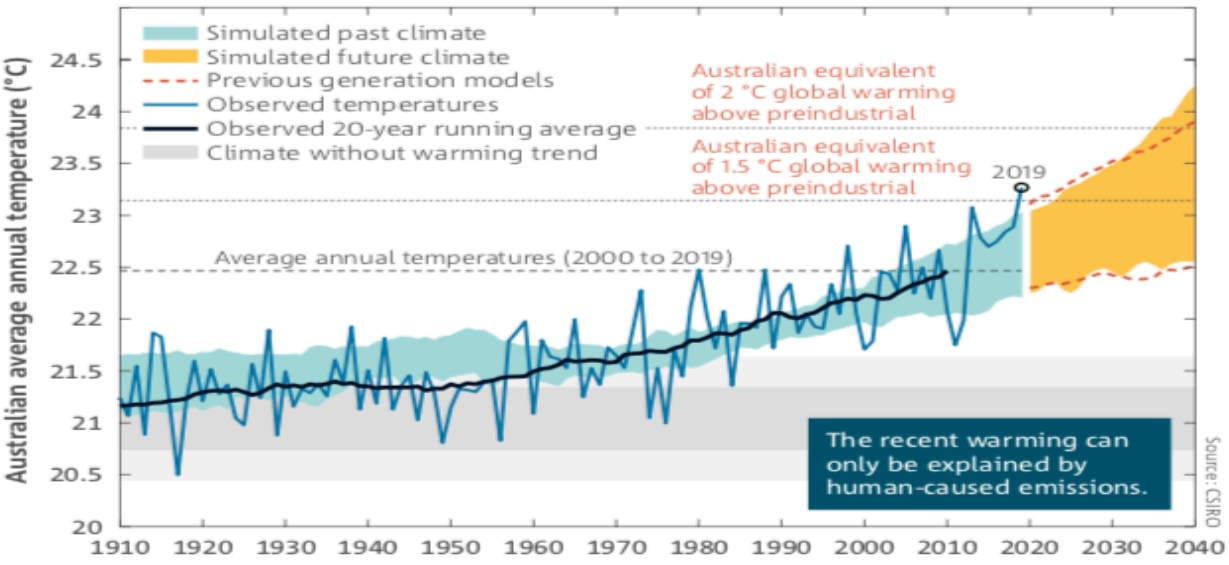
Given the potentially reduced magnitudes of surface water flow in the Mitchell River identified in the first point above, the availability of water for winter fill harvesting to supply water for mine operations could also reduce, and greater demands on groundwater could result. In the worst-case scenario in year 15, peak yearly groundwater demand could increase from around 1.7 GL per year using current climate data to a worst case of the order of 2.8 GL per year, an increase of approximately 65%.

We ask the committee to seriously consider the fact that very few projects in our current times, finish on time, as we will touch on later.

- 2- The data set being used only maps the impact created from 2030, (possibly even 2040) onward - yet the mine hopes to be operational from 2022. Therefore, the analysis ignores the cumulative impact of climate from 2022-2030 or 2040 as it's not clear how the model treats the data.

Graph 1 & 2





For the record the CSIRO's 2018 state of the climate report does not stop its projections, as shown in their graph above, temperature anomaly's continue to climb to 2030 (the edge of the graph) registering at roughly 2.2 degrees warmer – (As per DEWLP recommendations we must use RCP 8.5)

This leads us to our first series of questions –

Exactly which data are being used to determine the baselines for the climate change indicators in the EMM model?

Do they accurately factor the full climate change impact through to 2037 and beyond?

Is it fair to eliminate climate modelling before the lands post mining rehabilitation has occurred?

If Kalbar have only considered climate change at the end of mining's (15-year period), then does this not require a completely new set of climate data points to re-calibrate EMM's model - allow for temperature anomalies et al.?

Is it suffice to say - If the river cannot provide, then the ground will?

What happens if both scenarios are unavailable? How long can the mine remain stagnant?

Have any of these computer models like Gold Sim, been associated or linked with 'failed' River Systems' - such as the Murray Darling?

What percentage of overall modelling vs actual measurements were undergone?

Climate Ignorance

Another requirement of the Water Act is that any amount of water that needs to be set for the environment - must be based upon the best available scientific knowledge. Kalbar's climate exclusions were not based on the most 'up to date' scientific knowledge or arguably the best. - EMM's report lists twenty references - considering this report was compiled in April 2020 it must be reasonable to assume "up to date science" would include the CSIRO's state of the climate reports from 2020 back.

Having recently written to the CSIRO we have been advised of a detailed list of up to date climate science for the East Gippsland Southern Slopes Region. To the best of our knowledge EMM have not used any of these – Notably the CSIRO's 2018 or 2020 State of the Climate report.

Whether the IAC recognises Kalbar to have disregarded its obligation to Ecological Sustainable Development by perhaps cherry picking climate data in favour of its take and use proposals, or that SRW may face unnecessary pressure in the future to provide this water - IT MUST be noted that both scenarios place the River at huge risk.

Additionally, the modelling is not accurate as it's end date cannot be taken at face value. Kalbar omit vast target criteria such as: climate change, stochastic data generation (as recommended in the 2020 DEWLP guidelines), - market conditions, shareholder convictions (if delayed), Viral pandemic's & Industrial relations challenges.

An end date of 2037 is hard to fathom, I struggle to think of a project small or large, from the Barrow Island Gorgon Gas Plant to the WGTP Benalla, to Adani, Darwin's Itchy's Gas Plant W. A's Worsley Alumina expansion, to a small Karara Iron ore stick build that's finished on time- Climate change (even according to the conservative RCP 8.5 plot) is not going to be forgiving, the last thing the River needs is more pressure.

However, again, this committee did provide EMM with the chance to correct some of these omissions, we believe they failed - Technical note TN037 from EMM does however give a summary leading to the next issue – Salinity

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(Salinity Revisited)

Whilst we acknowledge technical studies have been undertaken by Kalbar, upon review of the EES, there have been no included studies (independent or in-house) regarding: River salinity; impacts of slashing fresh water dilution flows;

Direct observations, anecdotal farmer evidence, state & local organisational data, citizen science programs *and* historical evidence[1] strongly support fresh water flushes (at any time of year) as keeping primary & secondary salinity at bay. In the case of Mitchell Rivers multi-million dollar downstream enterprises we estimate the critical importance & effectiveness of dilution flows to extend well past the last 50 - 100 years.

Under Kalbar's proposal to detract surface water, approximately 4.5 GL of water will be required for construction/start-up and 3 GL (pa) thereafter for a 15- 20-year operational period. In comparison 4.5GL makes up 67% of what regional irrigators already remove[2] dwarfing local town water reservoirs, well over triple the size of East Gippsland Waters (EGW) 'Mitchell storage reservoir'[3] — thus abetting an already stretched subtraction of annual fresh water volume.

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[1] The Salinity Audit of the Murray-Darling basin, A 100-Year Perspective.
Salinisation of land and water resources: human causes, extent, management and case studies

[2] http://www.srw.com.au/wp-content/uploads/2020/02/Mitchell-River-Basin-Local-Water-Report-2019.pdf

[3] https://www.egwater.vic.gov.au/water-storage-levels

Table 2 shows Mitchell River 'annual flow averages' as nearly halving over a 60 + year period.

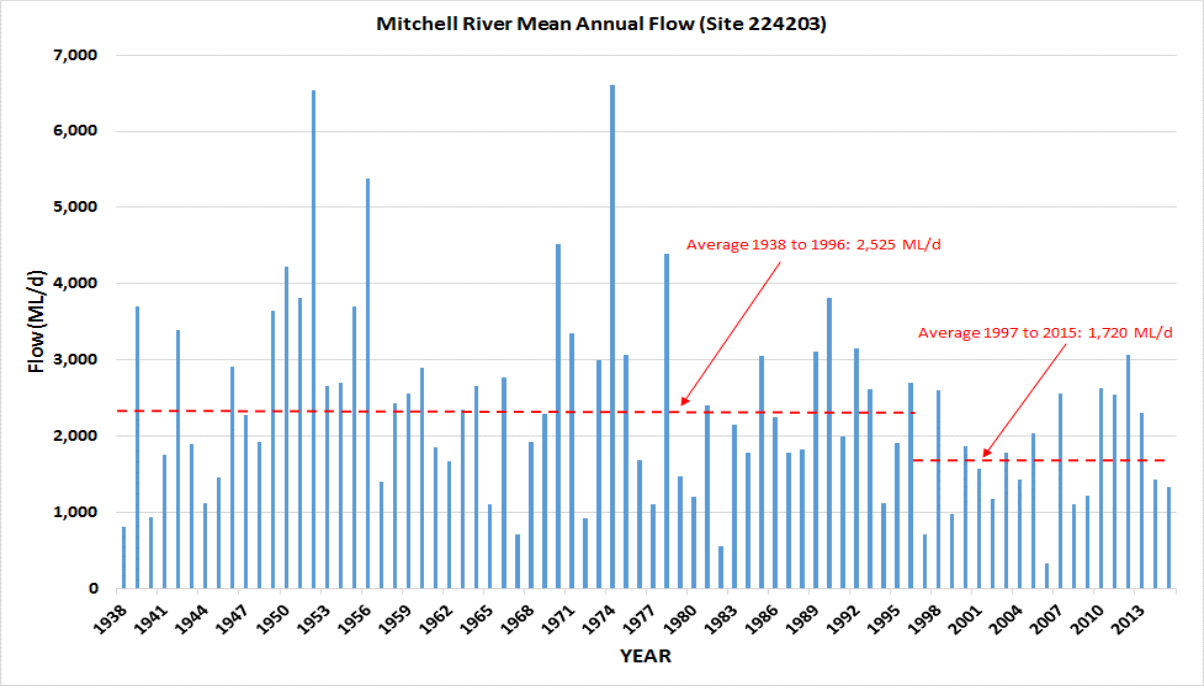


Figure 1- EGW - Annual Water Outlook - Dec 2016 to Nov 2017 (showing declining flow).

It is well known that the Mitchell River rock barrier (below Calvert st. Bairnsdale) acts as a preventative measure for salinity 'upstream' — established decades ago by John Monash as a tool for town water security & salinity protection.

The downstream Mitchell River pathway running through to the world famous 'Silt Jetties' suffers the worst salinisation of the entire system —many years remaining too salty to drink for months on end[4] — Only from the likes of groundwater bores & pre-filled dams, downstream enterprises can provide fresh water for livestock & horticulture during salty months.

The EGCMA (East Gippsland Catchment Management Authority) define river 'freshes' as 'the first seasonal 'flush' of water through a waterway'.[5] – These seasonal flushes (along with post saline flushing months) are exactly what the Kalbar project will alter.

[4] J.D Woodward Beef Cattle enterprise - water monitoring regimes show Dec – March as rivers saltiest months.
[5] https://egcma.com.au/wp-content/uploads/2019/06/East_Gippsland_Waterway_Strategy-Final.pdf

To quote Southern Rural Water (SRW):

'Groundwater levels are tied to Mitchell River flows & recharge during floods.'[6]

To quote EGCMA Regarding the Snowy River:

'The available scientific evidence suggests that the regulation of the Snowy River since the construction of the Jindabyne Dam and the resulting lower flows in winter and spring has allowed saline conditions to extend further upstream for longer periods.'[7]

The same report regarding the Mitchell Rivers close neighbour the Nicholson River states:

'Tests indicate that water conditions at three (sample) sites are generally good, although readings vary at different times. In the upper estuary, water quality is often quite poor, with test results indicating low levels of oxygen & a pungent 'rotten egg gas' smell. Since the floods in July 2007, water quality has improved. A long term trend is increasing salinity'.

This from Victorian Fisheries Authority:

'Estuary fish are present downstream from the rock barrier at Bairnsdale. The most common species are black bream (26-30 cm long) present in good numbers all year. During summer, if flows are low & salinity increases, there can be a massive upstream movement of European carp, with large numbers of European carp congregating below the rock barrier. '[8]

Rivers around our nation all share similar stories - the impacts of altered dilution flows are of utmost importance to the salinity of River systems. Examples, such as that of the 'Regional Valley Systems' in Western Australia are in such an advanced state of salinisation that no form of control is likely to ever see a return to farming enterprises.

Any attempt to further reduce the Mitchell Rivers flushing capacity will be catastrophic for already stretched saline periods of the Mitchell. Kalbar's 3GL(pa) is an excessive & un-acceptable amount of water to extract from much needed dilution flows.

[6] www.srw.com.au/files/General_publications/September_2011_-_Mitchell_River_Basin_Local_Water_Report.pdf
[7] https://egcma.com.au/wp-content/uploads/2019/06/Improving_East_Gippsland_Rivers.pdf
[8] https://vfa.vic.gov.au/recreational-fishing/fishing-locations/inland-angling-guide/areas/mitchell/mitchell-angling-waters

We are not alone, Kalbar's own peer review[9] states the following :

'It is understood that up to 3GL/year (~95L/sec) surface water may be extracted for 15 years from the Mitchell River. Two potential off-take locations are provided in the Project description, however, unlike the groundwater extraction scenario no assessment and/or modelling of impacts has been undertaken. The impact assessment (Coffey, 2019) does not include any assessment of the local impacts from extraction within the Mitchell River, and therefore has not met a number of the Scoping Requirements. This level of assessment is considered relevant for the EES irrespective of whether an allocation can be obtained. As a minimum, the impact assessment on the Mitchell River off-take should give consideration of the matters listed in Section 40 of the Water Act 1989.'

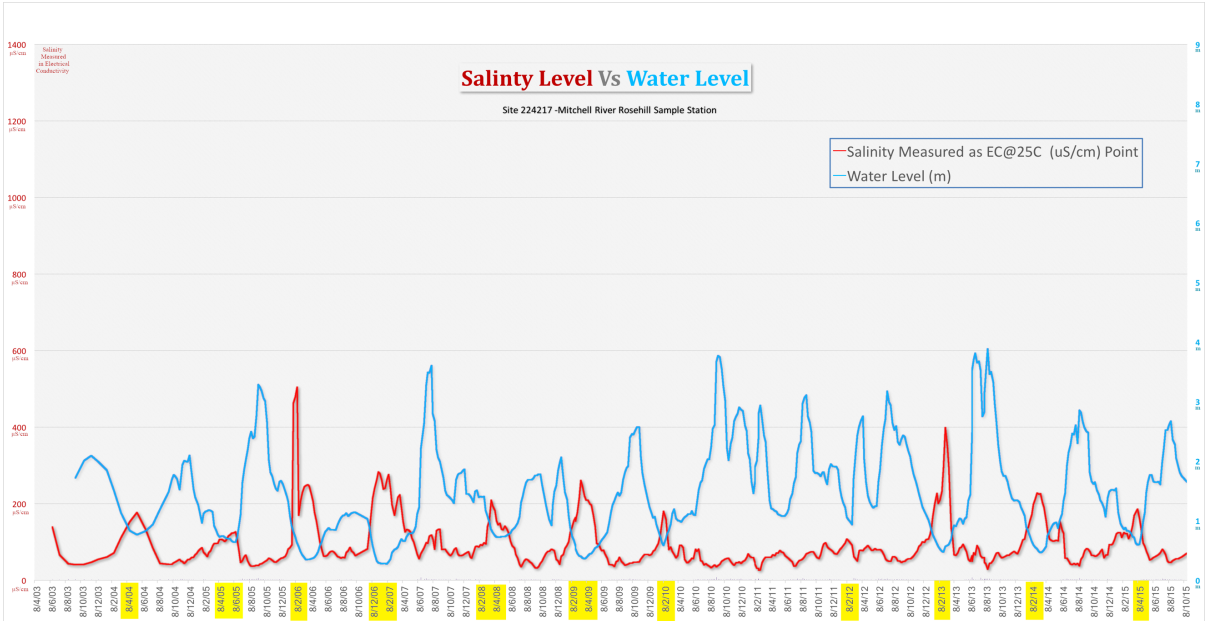
So it is apparent, through local knowledge, Kalbar peer review & Government opinion – *fresh water dilution flow is the single most important factor in eliminating River Salinity*.[10]

In light of this - Water extraction for this project scope will have significant impact on downstream dilution flows & salinity ultimately affecting: water supply; Agriculture (such as farmer Geoff's Cows); irrigation (affecting vegetables); stock watering; industrial & commercial use; water supplies; and water based recreation – Kalbar's surface water extraction places the Mitchell River's dilution flows into a losing battle.

[9] Kalbar - Water Independent Peer Review Report and Proponent Response - 4.2 Surface Water 4.2.1

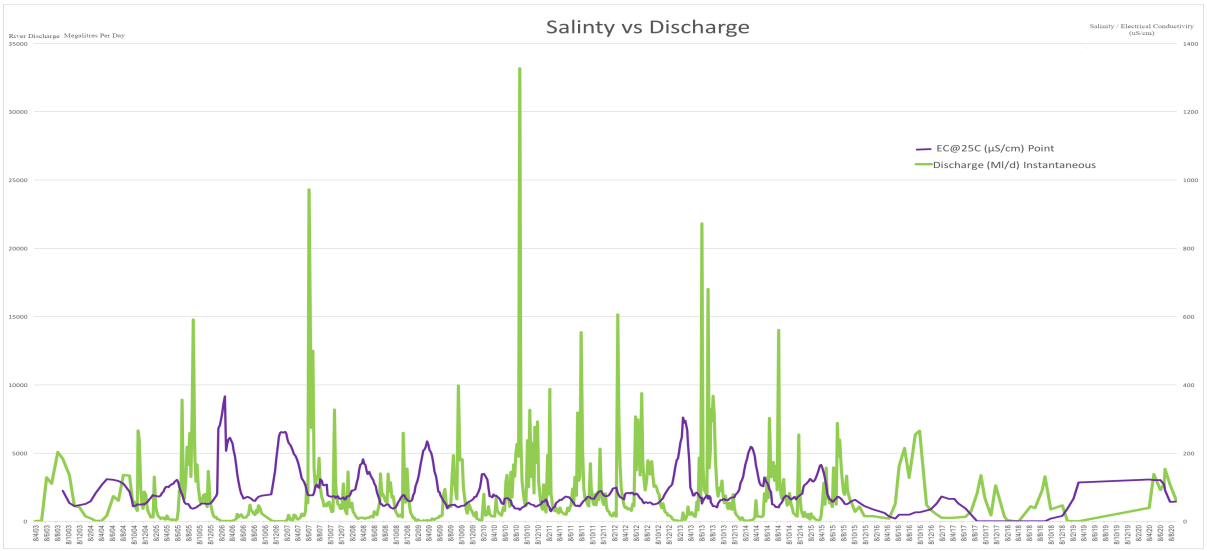
[10] www.aphref.aph.gov.au_house_committee_scin_salinity_report_chapter3.pdf
https://egcma.com.au/wp-content/uploads/2019/06/East_Gippsland_Waterway_Strategy-Final.pdf
DFU - (Down-stream Farmers Union) Anecdotal Evidence & Bio-Assay's

Laying claim towards the Mitchell Rivers (down-stream) fragile salinity issues, it's relationship between fresh water flows, water levels & water discharge we submit Graph 1 & 2 - clearly showing correlation between water levels & salinity[11].



As you can see when water (blue) is at reasonable levels salinity (red) is kept at bay. When water drops below average levels, salinity spikes! Yellow highlighted months (across bottom axis) show a pattern in dates with the Rivers Saltiest Months almost always 'December - March'. It is the following months from April to November that also prove critical

Graph 2



The same applies for Graph 2, with a direct correlation shown (water green, salinity purple). Data collected for these graphs are not downstream, data samples were taken above rock barrier where salinity levels are not as extreme as the downstream section of river (as explained shortly), yet we still see many months approaching WHO drinking water cut-off standards. All graphs show 13 years of data.

[11] Source data taken from https://data.water.vic.gov.au/

Water extracted leading up to saline periods are as equally as important as water taken during & after saline periods, with winter-fill freshes keeping salinity low preparing for spring & summer months. There is simply no room for Kalbar's yearly extraction without impacting dilution flows

As Kalbar have pointed out in their own report, and in line with our argument, proponent's scrutineers say – "Only the historical climate and river flow data have been investigated. It is likely that future climate and river flow will not replicate past climate and river flow, and as such the investigation gives only an indication of reliability statistics."[12]

Again, let us to refer back to our DEWLP 2020 Water Availability guidelines - this is clearly where Stochastic Modelling becomes a great tool.

Adding to these caveats, we make the following points –

- Historical data consolidated over the past 100 years, by the Water Measurement Information System (WMIS) & monitored by DELWP provides only 19 sample stations for the entire Mitchell Basin[13] – of those 19 only 6 show Salinity measurements & zero apply to any downstream sections of the river.
- Of all the current operational sample stations, only one is downstream, it does not measure salinity[14], interestingly the 4 readings that were taken in 2003 from the only (downstream) station[15] all show measurements of Salinity dangerously close to WHO (World Health Organisation) drinking cut off for Electrical Conductivity (EC).

As a side note - compiling this submission, we can reveal nearly all departments we spoke to openly admit — collection, collaboration & maintenance of data, between departments is, at best, a challenge — Changes in political landscapes, funding & resource allocations across all departments, become evident around impacted sectors as simple as 'River water sample stations'. This coupled with large numbers of farmers too proud to admit there's a rising issue such as salinity, creates a build-up of problems rarely factored into tabled science.

[12] Kalbar EES - 35_Appendix_A006AppF_Surface water assessment regional study.pdf
[13] https://data.water.vic.gov.au/
[14] Salinity is measured as Electrical Conductivity or µS/cm. According to WHO, EC values shouldn't exceed 400 µS/cm
[15] Site 224200 MITCHELL RIVER @ BAIRNSDALE has 4 readings on EC only

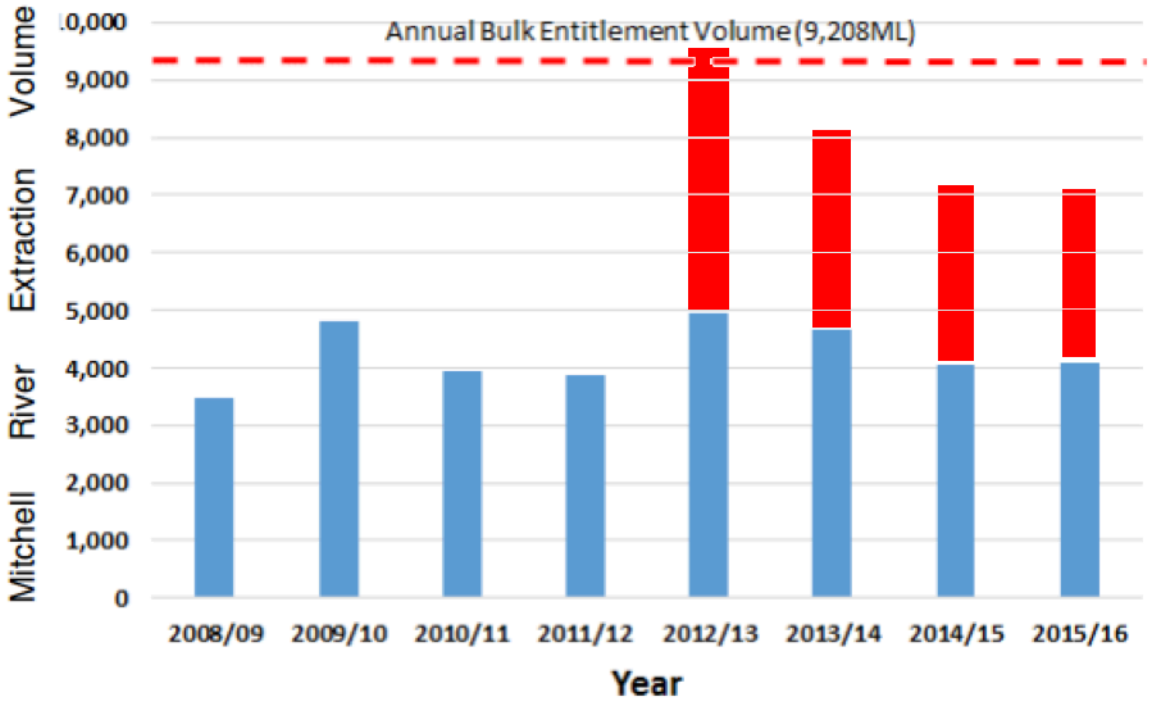
Throughout Kalbar's EES a diplomatic duty of care & fairness toward accurate reporting seems to be superficial, including but not limited to – Governmental reports taken out of context: An example of this is Kalbar's use of East Gippsland Waters Urban water strategy quoting their Extraction data to appear as though the Mitchell Rivers 'un-used extraction volume' may aid their cause. Kalbar States:

'With respect to water availability, the East Gippsland Water Urban Water Strategy (UWS 2017) notes [show]':

"Bulk entitlement annual volumes and maximum extraction rates are all adequate to meet projected system demands to at least 2065, with spare capacity to meet unexpected growth."[16]

This submission is *extremely* confident EGW did not calculate "unexpected growth" as a take & use water scenario of 4.5GL yearly & 3GL thereafter.

Kalbar's statement is then followed by an EGW graph which we have amended to include the mines annual fresh water take added to EGW's annual share - Kalbar Extractions shown in red.



As you can see if Kalbar's start-up was initiated in 2012/13 their extractions would hypothetically place EGW's headroom for capacity, over & close to limits.

Throughout Kalbar's reports many highlight potential extraction hazards:

[16] Kalbar EES - 35_Appendix_A006AppF_Surface water assessment regional study.pdf

Residual Impacts - Following the implementation of measures to avoid and minimise impacts on ecological values, the following impacts are likely to occur within the current project footprint as a result of the project':

'Potential reduced flows to Mitchell River following surface water extraction which may lead to localised impacts to the aquatic values along the River.'

'Alteration to the natural flow regimes of rivers and streams.'

Chapter 09 of Environmental and Socioeconomic Impact Assessment also states:

'*Extraction of surface water from the Mitchell River could lower the water levels in the river, in turn reducing seasonal recharge to the associated alluvial aquifer.****'***

To be fair, in context some go on to say effects will "not be measurable", however none have taken into account downstream salinity fragility nor have they used the best available scientific knowledge.

The surrounding Gippsland Lakes & Ramsar Wetlands rely on fresh water entering from its surrounding systems to also keep salinity down, recently West Gippsland's Thomson & Blue Rock Dams have been constructed & intensely irrigated – this has further reduced fresh-water flows to the Gippsland Lakes.

Unfortunately, Salinity spikes are not a criterion for SRW's water allocation nor do Kalbar appropriately factor in the risks – This is a real issue in the downstream section of the river which many departments can at times overlook, put simply if it wasn't overlooked we'd have a functional, up and running, locked timeframe Water Station, one that captures Electrical conductivity & more importantly total dissolved solids or TDS. Yet as I stand here today, downstream of the Rivers Barrier - there are none!

So as with any type of Science when the data is lacking you must make your way down the pyramid of methodology's – To use a public health analogy - from double blind placebo to a meta data analysis. Or in this case, we shift from 'water station data' → to 'anecdotal evidence' in support of the downstream salinity issues, and the anecdotal evidence is not pretty. All the way from my family's enterprise's to the mouth of the Mitchell, River salinity is getting worse.

Here we have sets of data taken from the most central location of the Mitchell's downstream path – The Wy-yung (Lind) Bridge.

Mitchell River - Lind Bridge EG_MIT540

East Gippsland | Mitchell River | Mitchell River | Mitchell River | 24_4 Mitchell River

11 results found (Displaying 1 - 11)

Details

18-08-2018
09:00am
Approved

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
		192.4	7.64	0.08	9.5	9.6		10

Habitat data

Bank Erosion Stability	Bank Vegetation	In Stream Cover	Riffles Pools Bends	Verge Vegetation	Overall
Good 4	Poor 4	Fair 6	Good 4	Good 8	26

21-07-2018
09:15am
Approved

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
		1642	7.57	0.09	11.8	10.2		5

21-04-2018
10:00am
Approved

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
		1450	7.54	0.1	22.5	21.8		13

Habitat data

Bank Erosion Stability	Bank Vegetation	In Stream Cover	Riffles Pools Bends	Verge Vegetation	Overall
Good 4	Poor 4	Fair 6	Good 4	Good 8	26

27-07-2004
15:00pm
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air °C	Water °C	P mg/L	Turb NTU
		1790	7	0.015	13	8		10

05-05-2004
07:45am
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air °C	Water °C	P mg/L	Turb NTU
	7	2920	7	0.015	10	12	0.11	10

01-05-2004
10:22am
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air °C	Water °C	P mg/L	Turb NTU
	3.8	1714	6.5	0.015	10.5	12.5	0.11	15

20-04-2004
06:34am
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air °C	Water °C	P mg/L	Turb NTU
	2.3	22500	7	0.14	7.5	13	0.28	10

02-04-2004
06:40am
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
	3.5	25340	7.5	0.08	15	18	0.14	10

14-04-2004
17:37pm
Approved

Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
	4.9	19410	7.5	0.08	20.5	20.5	0.14	10

25-10-1999
09:30am
Approved

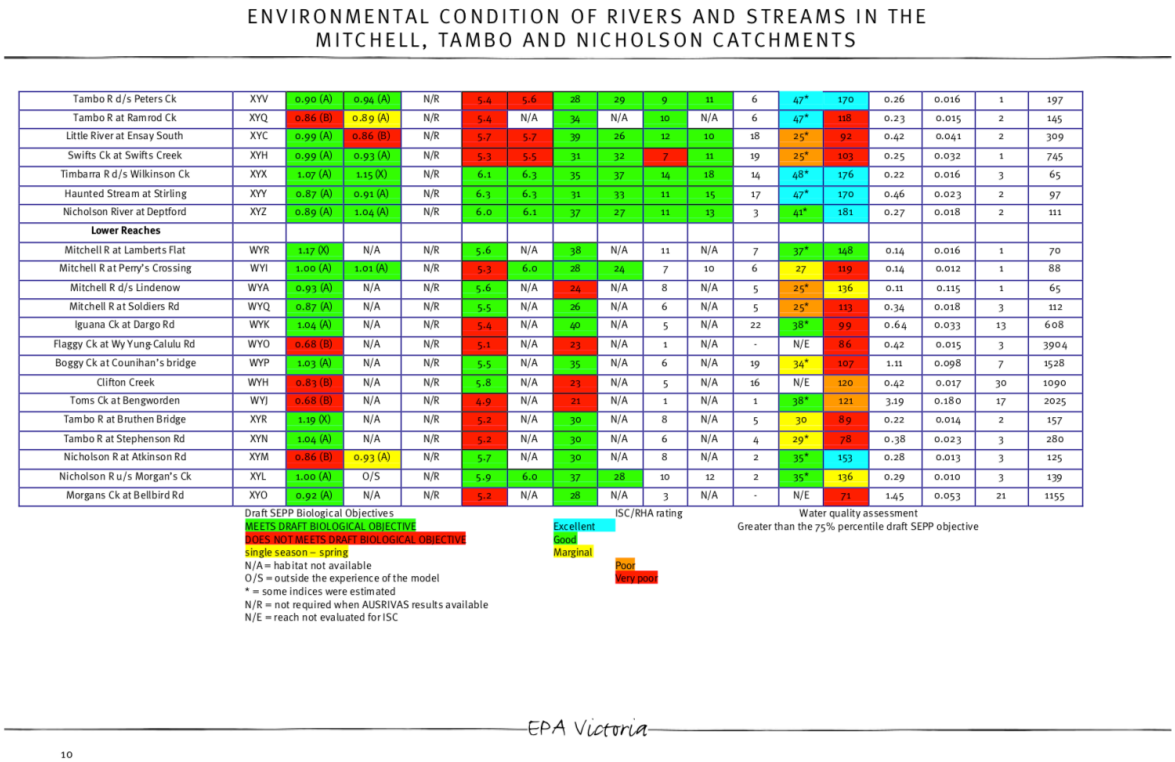
Creature data

Phys chem data

D.O. %	D.O mg/L	EC µS/cm	pH pH Units	rP mg/L P	Air ° C	Water ° C	P mg/L	Turb NTU
76	7.6	1310	6.4	0	14	15.2	0.025	10

Of 11 samples taken between 1999 & 2004 only one delivered a measurement that was drinkable (800 – 1500 micro Siemens). The four most saline samples were taken, (as highlighted earlier) between the problem months of December to March, these, again measured in electrical conductivity (micro Siemens)

Table 5 – EPA - ENVIRONMENTAL CONDITION OF RIVERS AND STREAMS IN THE MITCHELL, TAMBO AND NICHOLSON CATCHMENTS, Publication 853



ENVIRONMENTAL CONDITION OF RIVERS AND STREAMS IN THE MITCHELL, TAMBO AND NICHOLSON CATCHMENTS

Tambo R d/s Peters Ck	XYV	0.90 (A)	0.94 (A)	N/R	5.4	5.6	28	29	9	11	6	47*	170	0.26	0.016	1	197
Tambo R at Ramrod Ck	XYQ	0.86 (B)	0.89 (A)	N/R	5.4	N/A	34	N/A	10	N/A	6	47*	118	0.23	0.015	2	145
Little River at Ensay South	XYC	0.99 (A)	0.86 (B)	N/R	5.7	5.7	39	26	12	10	18	25*	92	0.42	0.041	2	309
Swifts Ck at Swifts Creek	XYH	0.99 (A)	0.93 (A)	N/R	5.3	5.5	31	32	7	11	19	25*	103	0.25	0.032	1	745
Timbarra R d/s Wilkinson Ck	XYX	1.07 (A)	1.15 (X)	N/R	6.1	6.3	35	37	14	18	14	48*	176	0.22	0.016	3	65
Haunted Stream at Stirling	XYY	0.87 (A)	0.91 (A)	N/R	6.3	6.3	31	33	11	15	17	47*	170	0.46	0.023	2	97
Nicholson River at Deptford	XYZ	0.89 (A)	1.04 (A)	N/R	6.0	6.1	37	27	11	13	3	41*	181	0.27	0.018	2	111
Lower Reaches																	
Mitchell R at Lamberts Flat	WYR	1.17 (X)	N/A	N/R	5.6	N/A	38	N/A	11	N/A	7	37*	148	0.14	0.016	1	70
Mitchell R at Perry's Crossing	WYI	1.00 (A)	1.01 (A)	N/R	5.3	6.0	28	24	7	10	6	27	119	0.14	0.012	1	88
Mitchell R d/s Lindenow	WYA	0.93 (A)	N/A	N/R	5.6	N/A	24	N/A	8	N/A	5	25*	136	0.11	0.115	1	65
Mitchell R at Soldiers Rd	WYQ	0.87 (A)	N/A	N/R	5.5	N/A	26	N/A	6	N/A	5	25*	113	0.34	0.018	3	112
Iguana Ck at Dargo Rd	WYK	1.04 (A)	N/A	N/R	5.4	N/A	40	N/A	5	N/A	22	38*	99	0.64	0.033	13	608
Flaggy Ck at Wy Yung-Calulu Rd	WYO	0.68 (B)	N/A	N/R	5.1	N/A	23	N/A	1	N/A	-	N/E	86	0.42	0.015	3	3904
Boggy Ck at Counihan's bridge	WYP	1.03 (A)	N/A	N/R	5.5	N/A	35	N/A	6	N/A	19	34*	107	1.11	0.098	7	1528
Clifton Creek	WYH	0.83 (B)	N/A	N/R	5.8	N/A	23	N/A	5	N/A	16	N/E	120	0.42	0.017	30	1090
Toms Ck at Bengworden	WYJ	0.68 (B)	N/A	N/R	4.9	N/A	21	N/A	1	N/A	1	38*	121	3.19	0.180	17	2025
Tambo R at Bruthen Bridge	XYR	1.19 (X)	N/A	N/R	5.2	N/A	30	N/A	8	N/A	5	30	89	0.22	0.014	2	157
Tambo R at Stephenson Rd	XYN	1.04 (A)	N/A	N/R	5.2	N/A	30	N/A	6	N/A	4	29*	78	0.38	0.023	3	280
Nicholson R at Atkinson Rd	XYM	0.86 (B)	0.93 (A)	N/R	5.7	N/A	30	N/A	8	N/A	2	35*	153	0.28	0.013	3	125
Nicholson R u/s Morgan's Ck	XYL	1.00 (A)	O/S	N/R	5.9	6.0	37	28	10	12	2	35*	136	0.29	0.010	3	139
Morgans Ck at Bellbird Rd	XYO	0.92 (A)	N/A	N/R	5.2	N/A	28	N/A	3	N/A	-	N/E	71	1.45	0.053	21	1155

Draft SEPP Biological Objectives
MEETS DRAFT BIOLOGICAL OBJECTIVE
DOES NOT MEETS DRAFT BIOLOGICAL OBJECTIVE
single season – spring
N/A = habitat not available
O/S = outside the experience of the model
* = some indices were estimated
N/R = not required when AUSRIVAS results available
N/E = reach not evaluated for ISC

ISC/RHA rating
Excellent
Good
Marginal
Poor
Very poor

Water quality assessment
Greater than the 75% percentile draft SEPP objective

EPA Victoria

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In 2002 the EPA also ran salinity measurements through the way of River Condition Report. Out of the publications 45 test sites the highest reading was at Wy-Yung – Calulu rd., the water being undrinkable.

These problems cannot be amended once in play; they must be struck out before they occur. Reducing flows & altering flow regimes is not a standard we should walk past, nor is it a standard we should accept.

We believe, my Pop believed that fresh water will become one of the greatest threats our great country will face over the coming decades.

Writing this submission, doing this research, we have encountered vast arrays of problems regarding fresh water – towns relying on 30-60-year-old underground aquifers, nation-wide salinity issues, water accountancy corruption, River mismanagement, water theft & water commodification & an ever increasing sense of community concern - Australia's water storage is 25% less than it was 25 years ago & climbing.

Conclusion

In closing we'd like to acknowledge the people of the Murray Darling Basin, including the culturally associated first Nations People from whom over 2 trillion litres of water has vanished[17]. They are some of the most extremely resilient, courageous & caring people fighting for rejuvenated ecology we have come across. Although its River system & ours are separated by thousands of kilometres of land we share their pain and anguish in recognising the need for greater transparency around water accountancy & the ecocide all River systems face.

We'd also like to acknowledge River people in general & anyone that has a connection with the Mitchell River & its waters.

Finally, a comparison between a farmer's thoughts & an anthropologist's.

To Quote Wade Davies:

"In three generations, a moment in time, we have contaminated the water, air, and soil, driven countless species to extinction, dammed the rivers, poisoned the rain, torn down the ancient forests, and ripped holes in the heavens. As Harvard biologist E. O. Wilson reminds us, this century will be remembered not for its wars or technological advances but rather as the era in which men and women stood by and either passively endorsed or actively supported the massive destruction of biological diversity on the planet."

To Quote my late Grandfather, Dave Woodward:

"When the farms going alright, everybody's going alright"

Thankyou.

[17] https://www.2tm.com.au/post/where-did-all-the-water-go-new-report-reveals-2-trillion-litres-missing-from-murray-darling#:~:text=A%20new%20report%20has%20revealed,its%20inception%2015%20years%20ago.