drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes(1)Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the dochttps://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0(2)Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011(3)SMEC Australia, Terrestrial Ecology Impact Assessment, 2011(4)NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.(5)NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney,viewed 03 August 2020,<https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections>Scroll down to "Local Government Factsheets".(6)Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.(7)The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional DemandManagement Strategy : preferred options, Rous County Council, Lismore.(8)Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities forHunter Water, Institute for Sustainable Futures, Sydney.(9)Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)(10)Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from globalexperience?, Water Research Australia Limited,Adelaide.(11)Windhoek Goreangab Operating Company (Pty) Ltd 2020,Our history | Wingoc, Veolia Environment,Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwatertanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation andmuch increased community resilience for future climate risks. This more than covers the 0.9GL extrawater needed by the 12,720 new people predicted to come to our area based on 194L/person/dayaverage water use (Rous).(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Yourhome, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts ofgroundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6August 2020,<https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Thank you for your time and consideration of my submission.

Naomi Shine

[redacted]

[redacted]

From: Brenda Crosby [redacted]
Sent: Wednesday, 9 September 2020 4:24 PM
To: Records; brenda crosby
Subject: The proposed Channon dam

To whom it may concern re: proposed new dam at The Channon.

This letter is to lodge my dismay about the proposed new Dam at the Channon. I'm very concerned that Rous council is preparing to spend around 240 million to flood 253 hectares of rainforest and farmland .What concerns me is that there has been no analysis and costing of an investment in system-wide water efficiency. Without this analysis and costing Rous County Council cant possibly make a decision that the dam is the best option . What also concerns me is the flooding of 7 hectares of warm temperate rainforest on sandstone . This type of rainforest is extremely rare in the region we would also experience the loss of 9 threatened Flora species and the loss of habitat for 17 spieces of threatened fauna including Koalas. These koalas have suffered a massive hit with the recent bushfires and increasing loss of habitat. With the severance of local wildlife corridors aquatic plant and animal species including platypus would also be adversely affected by the dam . This destructive Dam is not necessary please reconsider other more suitably ecologically responsible ways to increase water capacities.

Sincerely

Brenda Crosby
[redacted]

[redacted]

From: Wendy Livingstone [redacted]
Sent: Wednesday, 9 September 2020 5:07 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam - change human habits not the environmental habitat

I Wendy Livingstone of [redacted] wish to express my concerns regarding the proposed dam at Dunoon.
I have only general knowledge of things environmental but ask councillors to consider:

- If this project was proposed previously and rejected, what has changed so that it is now acceptable (*if it is due to climate change & recent droughts it should be considered that a dam may not be effective due to the requirement of sufficient rainfall to ensure a dam is viable)*
- I do not need to repeat the well acknowledged concerns regarding damage to flora and flora and historical heritage involved in building a dam
- This option does not recognise and consider everyone's individuals responsibility for their water use and measures such as residential water collection, water recycling, prevention of water wastage *(it goes no way to educate e.g. we will continue to see agricultural paddock irrigation during the hottest part of the day, watering of household lawns)*
- Humans need to change and step up instead of once again making the environment pay for our indiscretions that has led to the need for very discussion

Thank you for the opportunity to comment
Wendy Livingstone

[redacted]

From: Mel Rogers [redacted]
Sent: Wednesday, 9 September 2020 10:31 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam and the Future Water Project 2060

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

From:
(Ms) Mel Rogers
[redacted]

Dear Rous Counvillors and Gen. Manager

Thank you for supporting the extension of the submission date, as a community member I appreciate it. I acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.

- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)

Rous is required to avoid this destruction because there are economically viable and more effective solutions.

- Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

- Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

- The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)

- Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)

- Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8) Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

- Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history(10)

- Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater

- Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

- Groundwater, where this is environmentally safe

The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13) https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011

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14) Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August

2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Thank you for accepting and reading my concerns, and I look forward to hearing further on this important matter.

Kind regards

Mel Rogers

[redacted]

From: Lismore Environment Centre [redacted]
Sent: Wednesday, 9 September 2020 12:56 PM
To: [redacted]
Subject: The proposed Dunoon Dam as part of the Future Water Project 2060

Naomi Shine
[redacted]

9th September 2020
Rous County Council,
Lismore NSW 2480
<council@rous.nsw.gov.au>

I represent the Lismore Environment Centre, a local community organisation. We have discussed the Future Water project and particularly the proposed Dam.

Our response is that we oppose the proposal for a Dunoon Dam.

We propose Rous consider all other alternative water supply options, including:

- Demand Management (scarcity pricing etc.)
- Water Tanks
- Recycled Purified Water
- Desalination
- Innovative Solutions such as constructed wetlands, integrated sewerage treatment systems, etc.

WE DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

•Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastestway to ensure supply-demand balance. By focussing on system efficiency, Sydney added anadditional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSWGovernment) (1)

●The 21st century is about a suite of smart water options. This dam would be a lostopportunity to make our system fit for the 21st century. It would swallow all resources in onebig expensive 'white dinosaur' project.
●The dam would encourage continued inefficient and often wasteful water managementby local governments. They would have no incentive to do things differently.
●Destruction of important Indigenous cultural heritage, including burial sites (CulturalHeritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.
●Destruction of The Channon Gorge and its endangered ecological community oflowland rainforest (including regionally rare warm temperate rainforest on sandstone), and itsthreatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).Rous is planning to offset the loss of rainforest on sandstone with regeneration of degradedland in the buffer zone. Offsetting is problematic because the type of vegetation offered asrecompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)Councils are required under State planning regulations to: "Focus development to areas ofleast biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchyto biodiversity, including areas of high environmental value." NSW Department of Planning,Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and watercatchments. (4) Rous is required to avoid this destruction because there are economically viable and moreeffective solutions.

●Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks,visual impact. Ongoing sound impact from pump house etc.
●Higher prices for consumers due to a 4x increase in the cost of water. Rous generalmanager, in response to a question from councillor Vanessa Ekins, said he expected afourfold increase in the cost of supplying water if the dam is built.
●The small population increase predicted for the four Rous-supplied councils of 12,720(5)between 2020-2060 does not justify such a large and destructive dam. The dam risks beingan expensive white dinosaur, diverting expenditure away from more sustainable, flexible andeffective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSWpopulation projections ', Sydney, viewed 03 August 2020,<https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)
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●Potential for a big dam to drive unneeded population growth, as the governmentattempts to gain value from an otherwise unnecessary, and stranded, asset.

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I believe we need to take action on a suite of smart water options and proven alternatives.The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meetour water needs too. This is 21st century thinking.
●An investment in system-wide water efficiency and strong demand management.Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this increating their future water plan)Existing research over the past decade consistently finds that the best 'bang-for-buck'investment in water supply comes from demand management and identifying savings withinthe existing supply.(7) (8)Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation ofwater use is possible and economical. In comparison, the proposed dam is simply financially,environmentally and socially irresponsible.(9) (Stuart White, 2020www.bit.ly/Prof-Stuart-White-Rous-slides)
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Thank you for your time,

Naomi Shine
Chair
Lismore Environment Centre
[redacted]

[redacted]

From: daisy edwards [redacted]
Sent: Wednesday, 9 September 2020 9:59 AM
To: Records
Cc: [redacted]
Subject: The Proposed Dunoon Dam within Future Water Project 2060

Sarah "Daisy" Edwards
[redacted]

Dear fellow human beings aka Rous councillors and GM, Thank you for allowing time for further community submissions. I am a concerned citizen of the Northern Rivers region and a Registered Nurse whom cares passionately about people and the environment, and I DO NOT Support the Channon Dunoon Dam for these reasons:
This is sacred Aboriginal land, the Widjabul-Wyabul People are connected to this place in a living way, ancient burial sites, rare sandstone and stones cannot be lost forever!

A large number of different species of marsupial, birds, frogs, insects, trees and plants would be facing huge losses and possible extinction if this project is allowed to go ahead.

Please leave the rainforest alone, it needs to recover and this anthropocentric behaviour has to stop! Listen to the custodians of this land and beyond whom you represent.

Water efficiency surveys need to be conducted immediately and alternative, sustainable methods should be favoured for the sake of the future generations of all living things at Channon Gorge.
Surely fixing a leak and supplying self sufficient water tanks for locals, and not wasting clean high grade drinking water on poo and car washing is less costly to the planet and Rous waters bank balance!

In these current times we should be changing our infrastructure, to enable us to deal with future climate change and treat water as the precious resource it is; No more WASTE!

May I remind you at Rous water of the homegrown film "Fern Gully" and stress our need to protect nature not demolish everything in our path!
We have the chance to realign ourselves with the natural world, and avoid further extinction of our iconic species, including humans.
Our precious water is not for sale! We must be led by a regenerative harmonious culture with all life and the environment.

No more ecocide! Listen to the voice of the forest and its protectors! Respect water and life! Be on the virtuous side of history! #WeWantToLive

Love Peace Rage and Rebellion
Rebel Daisy Lightyear Nutty Brown aka Sarah Edwards

[redacted]

From: Dewi Chai [redacted]
Sent: Wednesday, 9 September 2020 9:41 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the 2060 water project

From:
Dewi Chai
[redacted]

9th September, 2020

To: Rous County Council, Lismore NSW 2480

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060
My name is Dewi Chai - my family and I live in Terania Creek.

I object to this dam being built. First and foremost, my objection is that this area of the Northern Rivers is one of the most biodiverse areas in NSW, and is home to many rare and endangered species.

To flood an area of temperate rainforest in this region is not an environmentally sound decision. Australia, particularly NSW, has lost vast areas of habitat for **koalas** and other already threatened species to recent bushfires. The area of this proposed dam is part of one of the small areas left partially intact for these species.

Furthermore, Australia's water management is wasteful considering our arid climate, and there are alternative ways to preserve water, for example with mandatory water capture in urban areas for all new dwellings (at the very least).

Thankyou for supporting the extension of the submission date. I do acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- • **Lost opportunity to invest in system-wide water efficiency**- this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional

950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) [1]

- ● **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- ● **The dam would encourage continued inefficient and often wasteful water management by local governments.**They would have no incentive to do things differently.
- ● **Destruction of important Indigenous cultural heritage,**including burial sites (Cultural Heritage Impact Assessment, 2011)[2].Ongoing disregard for First Nations' heritage.
- ● **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest**(including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)[3].

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

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Rous is required to ***avoid***this destruction because there are economically viable and more effective solutions.

- ● **Industrial/construction zone**for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- ● **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- ● **The small population increase**predicted for the four Rous-supplied councils of 12,720[5]between 2020-2060 **does not justify**such a large and destructive dam. The dam risks being**an expensive white dinosaur**, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections*', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projecti ons> scroll down to "Local Government Factsheets".[5]
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  Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in

water supply comes from demand management and identifying savings within the existing supply.[7] [8]

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.[9] (Stuart White, 2020www.bit.ly/Prof-Stuart-White-Rous-slides)

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- ● **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.[11] *This builds community resilience - much needed, as the recent extreme bushfire season has shown.*

  The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

  Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[12]https://www.yourhome.gov.au/water/rainwater

- ● **Contingency planning** would enable Rousto be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- ● **Groundwater, where this is environmentally safe**

  The Australian government provides a lot of information on the ecological impacts and groundwater usage.[13]https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown

  With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

1. (1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc

   https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

2. (2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
3. (3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
4. (4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03

   August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan> , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.

5. (5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections*', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to "Local Government Factsheets".
6. (6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
7. (7) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options*, Rous County Council, Lismore.
8. (8) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water*, Institute for Sustainable Futures, Sydney.
9. (9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

(10)Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?,* Water Research Australia Limited,Adelaide.
(11)WindhoekGoreangabOperatingCompany(Pty)Ltd2020*,Ourhistory|Wingoc,*VeoliaEnvironment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).

(13)Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home*, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>

(14)Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-dr awdown>

Thank you for your time.

Dewi Chai.

From: Maria Walsh
To: Records
Cc: [redacted]
Subject: e p oposed Du oo Da w t t e Folu e Wate P oject 2060
Date: Wednesday 9 September 2020 7:05:25 PM

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Maria Walsh

[redacted]

[redacted]

9th September 2020

Rous County Council, Lismore NSW 2480

council@rous nsw gov au

Dear Rous Councillors and General Manager - Re: The proposed Dunoon Dam within the Future Water Project 2060

[redacted]

I 'm writing to object to the proposed dam for environmental, cultural and habit reasons. I have lived on the North Coast for over 34 years and believe this dam is unnecessary and will cause a range of significant problems. I realize the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons

- **Lost opportunity to invest in system-wide water efficiency** - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) [1]

- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. t would swallow all resources in one big expensive 'white dinosaur' project.

- **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.

- **Destruction of important Indigenous cultural heritage,** including burial sites (Cultural Heritage Impact Assessment, 2011)[2]. Ongoing disregard for First Nations' heritage.

- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest** (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)[3] . Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist) Council s are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www planning nsw.gov au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-t he-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. [4] Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.

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- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

- **The small population increase** predicted for the four Rous-supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks being **an expensive white dinosaur** , diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, < https://www planning nsw.gov au/Research-and-Demography/Population-projections/Projecti ons > scroll down to "Local Government Factsheets".[5]

- **Catastrophic flooding downstream in worst floods,** particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)[6]

- **Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset. I SUPPORT these alternatives** I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable power. t is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. (We understand Rous has *not* costed this in creating their future water plan) Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.[7] [8] Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.[9] (Stuart White, 2020 www bit.ly/Prof-Stuart-White-Rous-slides)

- **Water re-use in various ways,** including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

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https //www.waterra com au/publications/document-search/?download=1806[9] Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history[10]

- **Water harvesting** (urban runoff; rain tanks): Water tanks on all new (and existing) developments.[11] *This builds community resilience - much needed, as the recent extreme bushfire season has shown.* The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs." Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[12] https //www yourhome gov au/water/rainwater

- **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

- **Groundwater, where this is environmentally safe** The Australian government provides a lot of information on the ecological impacts and groundwater usage.[13] https://www.environment gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

[redacted]

From: Emma Stone [redacted]
Sent: Wednesday, 9 September 2020 5:56 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060 - Submission from Emma Stone
Attachments: The proposed Dunoon Dam within the Future Water Project 2060 - Submission from Emma Stone.pdf

TO: Rous County Council

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thank you for supporting the extension of the submission date. Finding the time to explore the complexities of this issue, in order to provide a constructive submission, has been challenging and without the extension my submission would have been limited as would have been the opportunity to raise awareness of the importance of this decision among the broader community. While the proposed dam will directly affect the land area of a small number of people, this proposal and Rous's direction with water management affects near every person in the region.

I DO NOT support the proposed The Channon-Dunoon Dam for many reasons.

I will start with reasons that are deeply personal and then progress to reasons based on logical opposition.

ECOLOGICAL VALUES

I am a resident of [redacted]. I have held position of secretary of [redacted] Landcare for 15 years. I am currently employed as the Landcare Coordinator for the Border Ranges Richmond Valley Landcare Network. Throughout the years I have been responsible for numerous projects that relate to conservation and restoration of areas of high biodiversity value. I have also supported dozens (if not hundreds) of private landowners across the Lismore, Kyogle and Richmond Valley Local Government Areas to build their knowledge and capacity to better manage their properties for these values. In 2019 I received Lismore City Council's Biodiversity Educator Award as a wonderful acknowledgement of my efforts in this space. While working across a broad landscape I appreciate the values that exist across many different vegetation communities. However, there is none more precious to me that the lowland subtropical rainforest of Whian Whian and specifically the Rocky Creek area.

I do not want to see this priceless endangered ecological community destroyed! It is cannot be replaced.

Many of the staff at Rous are well aware of my untiring efforts to support regeneration activities across the riparian areas of Branch and Rocky Creek. It has been a long-term personal endeavour of mine to see the riparian area of Rocky creek restored and protected from Rocky Creek Dam down to where Rocky meets Terania Creek in the Channon.

Driven by this goal, through Whian Whian Landcare, I have facilitated numerous grant funded projects progressing riparian restoration across 9 private properties within this Rocky Creek reach including achieving significant external funding for the Rous owned parcel at Whian Whian Falls.

Whian Whian Landcare is currently implementing a Fish Habitat Action Grant project funded by the Recreational Fishing Trust that is advancing restoration over a 900m stretch of Rocky Creek on the Petroff property. This includes connecting the wider community to the fish habitat attributes of Rocky Creek. On the 13th of September we will be conducting a 'covid safe' community planting of 300 trees to fill the gaps in the already established native riparian vegetation on this site. Should this dam proceed this site will be under water and I will join with many people as devastated by the impact to this exceptional area.

CULTURAL HERITAGE VALUES

I have a long history of working on environmental projects in close collaboration with Indigenous communities. In 2014 I graduated from the Gnibi College of Southern Cross University with a degree in Indigenous Studies majoring in sustainability. At that time, I received the Gnibi Prize for the highest grade point average for the degree. During 2017 I was awarded the Gnibi College Alumnus of the Year Award in acknowledgement of my application of the degree to the benefit of the local community. I share this as demonstration that I am not naive to Indigenous world views and values and have long stood beside Indigenous communities to see their values recognised and protected.

In 2010-11 I was part of a small group that worked closely with members of the Widjabul community (specifically Aunty June Gordon, Auntie Irene Harrington and Roy Gordon) to collate Indigenous (and other) cultural stories of the Coopers Creek catchment into the publication ' Coopers Creek – A Place of Many Stories'. This publication was part of the larger 'Reconnecting to Country' project as funded by the NSW Environmental Trust and managed by Rous Water. While this publication focused on the Coopers Creek catchment, through the journey I was extremely privileged to be able to hear of many site-specific stories and of the very rich cultural significance of these sites. Together with the Aunties we sat at points that looked out over the 'proposed Dunoon Dam' area and listened to the stories of the past, the significance of that area and the continuing deep connection felt for that country.

I do not want to see these priceless cultural sites destroyed! They cannot be replaced.

I appreciate the need to be sensitive to sharing of information as relates to Indigenous cultural heritage and am aware that this is the justification for not making the Cultural Heritage Impact Assessment available to the broader community. However, I believe there are ways that Rous County Council could facilitate broader community understanding of the Indigenous cultural values and the threat that the proposed Dunoon Dam presents to these values whilst still respecting the need for discretion with some aspects of such information.

JUSTIFICATION FOR THE DAM BASED ON A DECLINE IN WATER SECURITY AS A RESULT OF THE IMPACTS OF CLIMATE CHANGE

I understand that the drought of 2019 resulted in an escalated demand for water from Rous supplies and enhanced concern about future water security. However, **I question Rous's stated projections of water security as expected to decline by 22% by 2060 due to the effects of**

climate variability (Future Water Project page 5) and would like to see evidence (source of data) for Rous's such statistics.

I am currently the project coordinator for the 'Climate Ready Revegetation - Building Resilience for the Future' project. This is a cooperative project between Richmond Landcare Inc, The Border Ranges Richmond Valley Landcare Inc, The NSW Department of Planning, Industry and Environment - Cultural and Ecosystem Adaptation Unit and the faculty of Science and Engineering at Macquarie University. While this project focuses on ensuring resilience to future climatic conditions with revegetation ventures, it has involved scrutiny of the NARCliM (climate modelling) specifically for this part of the Richmond catchment to inform the on-ground activities.

As I expect you will know, the NSW and ACT Regional Climate Modelling (NARCliM) Project is a research partnership between the NSW and ACT governments and the Climate Change Research Centre at the University of NSW. The NSW partners include Sydney Water, Sydney Catchment Authority, Hunter Water, NSW Department of Transport, NSW Department of Primary Industry and NSW Office of Water.

Whilst there are significant modelling complexities to predicting rainfall, the NARCliM states "projections for the North Coast region's annual average rainfall range from a decrease (drying) of 8% to an increase (wetting) of 11% by 2030 and still span both drying and wetting scenarios (–6% to +31%) by 2070" (North Coast Climate Change Snapshot p.12).

STRONG DEMAND MANAGEMENT - ENABLING WATER EFFICIENCY AT ALL LEVELS

I do appreciate that rainwater tanks are not the silver bullet to demand management and understand the obstacles and limitations faced by Rous in making improvements to demand management simply through tanks. However, I strongly believe that increased investment by Rous to enable localised water harvesting would be a significant improvement to demand management. As Rous claims that rural landholdings (that are not connected to the Rous Water supply) contributed the peak demand during the drought then would it not also make sense to provide incentives for those properties also (beyond the existing incentives for tanks for Rous customers) to improve their water self-reliance status? As well as reducing demand during those tough drought times this would also support wider resilience to likely future bush fire events ((NARCliM) with increasing localised water availability across the landscape.

I have lived on rural properties in the Northern Rivers and remained entirely independent of town supply for the 25 years. As a result, of course, I understand well the mechanisms of living within our means as relates to sustainable water use. Through last years drought event my family of 4 remained independent of town water supply on a 22,000-litre tank and did not have to resort to purchasing water or topping up the tank with any other water source beyond rainwater. We have made a commitment to regularly audit our water use and adjust our use as relates to our supply. I appreciate that the average Rous water user is unlikely to make such commitments. However, if Rous was to provide a service to households to conduct water audits and incentive uptake of water efficiency recommendations this would go a long way to better demand management.

Improving efficiency clearly extends well beyond tanks. There are numerous opportunities available to improve efficiency at all levels of the supply spectrum. **I would like to see Rous conduct a system wide analysis of water use and pursue system wide efficiencies including adequate financial incentives to both household and business to enable uptake of contemporary water efficiency options before embarking on a new dam.** I strongly believe this is critical and central to the environmentally, socially, financially responsible path of future water security.

I am also in agreeance with numerous other concerns that have been raised and recommendations that have been put forward in full by other members of the community and will list such points below in dot form only. To give full substance to each of these points would make my submission unwieldly. Rather I chose to flesh out the areas as above that I have a personal connection to.

- **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.

- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive project.

- Concern about the four-fold increase in water cost to consumers into the future to meet the costs of this dam

- **Potential for a big dam to drive unsustainable population growth and unsustainable business activities, as the government attempts to gain value from an otherwise unnecessary asset.**

I am very hopeful that you will listen to the concerns of the community about this venture and abort from the proposed Dunoon Dam.

Kind Regards,

Emma Stone

[redacted]

From: Emma Stone [redacted]
Sent: Wednesday, 9 September 2020 6:47 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060 - Whian Whian Landcare Submission
Attachments: The proposed Dunoon Dam within the Future Water Project 2060 - Going Under - Whian Whian Landcare submission.pdf

RE: The proposed Dunoon Dam within the Future Water Project 2060

TO: Rous County Council

FROM: Whian Whian Landcare – [redacted]

9th September 2020

Dear Rous Councillors and General Manager

Whian Whian Landcare Inc. has been actively involved in environmental protection and restoration works in the locality of Whian Whian for over 20 years. We have engaged in various projects that have supported biodiversity, native bush regeneration, weed control, feral animal control, landslip prevention, fish habitats, water quality and community education.

We have a number of significant concerns about the proposed Dunoon Dam as follows

<u>Environmental impacts</u>

- According to Rous Commissioned Ecology reports, Nan Nicholson has summarised key impacts as being:

- The LOSS of 34 ha of Lowland Rainforest Endangered ecological community including 7ha of warm-temperate Rainforest on Sandstone as a highly unique ecological community.

- The LOSS of nine threatened flora species across the area impacted by the dam

- The LOSS habitat for 17 species of threatened fauna, including koalas

- The LOSS of connectivity for local wildlife corridors

- The LOSS of habitat for platypus

- The changes in the amount, velocity and timing of downstream flows will adversely affect existing aquatic plants and animals. (Nimbin Good Times Sept 2020)

- Local ecologists are concerned around the quality of the ecology report particularly regarding threatened species and the high ecological values of the site. There are many other threatened species that the report acknowledges as requiring further targeted surveys. Biodiversity is under extreme threat around the planet and is being increasingly disregarded in this rush for unnecessary and poorly considered plans.

- In constructing the dam there will be considerable environmental impacts in regard to materials, emissions etc.

- The proposed construction involves the creation of a 40m high concrete filled wall with no fish ladder. Members of the group have witnessed the migration of both short fin and long fin eels up Whian Whian Falls to populate and feed in areas above the falls. The wall will sever this pathway for this species as well as 16 other native fish species known to Rocky Creek.

- The proposed dam is an enabler for development and population growth on the North Coast. This will have its own cascading environmental impacts. It will also enable the kinds of development which doesn't reference environmental limitations.

Prime agricultural land impacts

- The valley is home to prime cropping, pecan and livestock food production areas.

- The importance of local, regional and national food security has been highlighted by the breakdown of international trade due to Covid-19. A tiny proportion of Australia's land has high quality soils and sufficient rainfall to provide high agricultural productivity (Prime Agricultural Land/Biophysical Strategic Agricultural Land). The proposed dam sits across a significant area of such prime agricultural land.

Soil erosion impacts on longevity of dam

Land management practices in the dam catchment areas is, in areas, exceedingly poor. Estimates of erosion (USLE) from parts of the catchment exceed 100 tonnes of soil per hectare per year. The dam itself is likely to be short lived in its intended capacity with these levels of input. There are no management plans presented as part of the dam strategy to address these issues.

The Indigenous cultural heritage impacts

Reconciliation and respecting our indigenous heritage are fundamental values of modern Australia and are put forward as values of Rous County Council. Landscape and the environment were intwined with indigenous values, lifestyle and spirituality. The cultural heritage study of the dam site has not been made public. Although a lot of cultural information was lost through European Colonisation we know that:

i) The valley to be inundated has 9 recorded burial sites, along with multiple artifacts, marker trees & scar rocks in the proposed inundation zone.

ii) The area downstream of the popular Whian Whian falls is a sacred women's ceremonial area. This would be submerged. Whian Whian Falls also a likely significant site.

iii) In the adjacent area (only described as Dunoon) ancient clay figures of a koala and a human head estimated at several thousand years old were uncovered in 1953 (JG Steel Aboriginal Pathways pg 22);

iv) Grinding stones have been located on ridge just above the dam landscape.

v) Dorrobee grasslands, an indigenous fire managed landscape is nearby and its extensive cultural history and value has been recognised,

vi) Upstream is a clan size habitable cave with a waterfall overhead.

Many parts of this valley are not highly disturbed. Flooding the valley carries the risks of drowning and making more unknowable and unconnectable Indigenous cultural heritage.

Good community Landcare work destroyed in the construction of the dam.

Whian Whian Landcare have an active fish habitat project site in the dam footprint, fencing the riparian zone, replanting trees, and providing off stream watering for the landholder's cattle.

Tuntable Creek Landcare Inc and Dorroughby Grass Reserve Trust Landcare also work in the local area on both public and private lands. These groups have been investing volunteer effort into restoring the ecology of this area for over 20 years, works which will be impacted directly and indirectly by the proposed dam.

Local community members are being displaced

Several long-term families will have their homes and lands destroyed in the process of the dam construction. We feel their voices need to be weighted particularly highly in the discussion. The proposal presented did not mention their perspectives at all.

Rights of Nature are being ignored

In some countries the rights of nature to exist unfettered by humans is being put into law. Like we have fundamental human rights, it is now recognised as valid that nature has fundamental rights.

Australian law is behind in putting this into its legislation, but it is important that this proposal is cognisant of these issues.

A broader consideration of water supply

Rous County Council is in the business of supplying water. Its main function (in addition to weed management and flood mitigation) is the '*regional water supply authority providing water in bulk*'. It has, by

definition, a vested interest in being the primary supplier of water and therefore would receive no benefit in divesting control of all or part of that water supply to consumers. There is a need for independent assessment from the perspective of whole of society and ecosystem outcomes.

A systems approach has not been fully explored. For instance, the installation of tanks as a compulsory requirement for new houses and as strongly encouraged through more generous subsidies for existing houses could supply a significant proportion of household water requirements. There are approximately 20 000 dwellings in Lismore. If they captured the rainfall that fell on their roofs, that could potentially provide (very roughly) at least 1 Ml of water. Extension of such a scheme across of Ballina, Byron and Kyogle would provide significant amounts of water in comparison to a new dam.

Other strategies should include:

- Repairing and stopping leaks would make a marked (17%) difference and are said to create the biggest gains for money spent.

- Encourage a reduction in water use. Engage in community awareness and the adoption of technologies to assist with this. Facilitate the adoption of minimal toilets and showers. Facilitate native gardens. Potential to adopt pricing systems etc. Stuart White from UTS has provide a detailed and costed water proposal “The Rous Sustainable Water Program” www.bit.ly/Prof-Stuart-White-Rous-slides

- Adopt technologies that enable various qualities of water to be used, depending on the purpose. High quality water can be reserved for high quality needs such as drinking or bathing, or washing up. Recycled and cleaned up water could be used for other cleaning or gardening or cooling or roadworks for example. https://www.waterra.com.au/publications/document-search/?download=1806

- Adopt technologies that clean up municipal wastewater instead of releasing it into the landscape.

There should also be more careful consideration of the placement of the proposed dam. Putting it a short distance downstream to an existing dam places all your eggs in one basket (reliant on one relatively small part of the Richmond catchment with one treatment plant). In a changing climate with longer dry spells and heavier rainfall events this is an extremely risky strategy.

The recent bushfire season has also highlighted the additional benefits of household water tanks for this purpose. As water storages available for fire events they lessen the stress on bulk water supplies in these times.

Recreational Use Concerns

There is a lack of clarity around recreational use of the dam should it go ahead and this reflects the ad hoc decision making process:

Keith Williams stated that the Dunoon Dam would be available for public recreation:
https://www.echo.net.au/2020/07/rous-water-chair-puts-case-for-the-dunoon-dam/

However, the Rous Water Policy: Private Recreation Community Events and Commercial Uses on Operational Land policy' (2014) shows that permitted activities in the Proposed Dam excludes **any** recreational activities (except at Whian Whian Falls).

And the current Rous dam feedback submission site (https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-KZG-22-16-87) states that recreational opportunities exist **but** would require a 'comprehensive risk assessment ….(to)… be undertaken in later stages of the project should the dam proceed'.

We ask that these points be taken into consideration in making the decision to further investigate this Dam proposal.

This submission has been reviewed and endorsed by the Whian Whian Landcare Executive Committee.

[redacted]

From: Verdecon Accounts [redacted]
Sent: Wednesday, 9 September 2020 9:33 AM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

9th September 2020
Rous County Council,
Lismore NSW 2480
<council@rous.nsw.gov.au>

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

Thankyou for supporting the extension of the submission date. We also acknowledge the complexity of what Rous does to provide water to our region.

*My Name is Holly McQueen a [redacted] Resident and mother of two small children who cares deeply about the environment and the state of the planet right now. Can we please choose the earth first? If we continue down the path we are on, we will have to stare down at our grandchildren with distress in their eyes wishing we had done better. We can do better. Right Now. We have the intelligence, we have the technology, we have other options. Literally listed below. Please let's be bigger than the problem. Do you agree with Adani? How is this different? It is sprinting in the wrong direction, this must stop now. Please consider my plea.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:
• Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government)

(1)
• The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
• The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
• Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)
(2)
. Ongoing disregard for First Nations' heritage.
• Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)
(3)

.Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
Councils are required under State planning regulations to: “Focus development to areas of least biodiversity sensitivity in the region and implement the ‘avoid, minimise, offset’ hierarchy to biodiversity, including areas of high environmental value.” NSW Department of Planning, Industry and Environment 2019, ‘Delivering the plan’, Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

● Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
● Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
● The small population increase predicted for the four Rous-supplied councils of 12,720
(5)
between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, ‘NSW population projections ’, Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to “Local Government Factsheets”.
(5)
● Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)
(6)
● Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.
I SUPPORT these alternatives:
I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.
● An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best ‘bang-for-buck’ investment in water supply comes from demand management and identifying savings within the existing supply.
(7)
Professor Stuart White from UTS has provided a detailed and costed proposal “The Rous Sustainable Water Program” which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.
(Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
(8)
● Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia’s report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806

(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history
(10)
● Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.

(11)
This builds community resilience -
much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: “Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs.”
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.

(12) https://www.yourhome.gov.au/water/rainwater

● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
● Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.
(13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground
water-drawdown
With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Kind Regards,

Holly McQueen
Wed-Friday 9am-4:00pm
[redacted]
We acknowledge the traditional custodians of the land on which we work and pay our respects to their elders past, present and emerging.

[redacted]

From: Trafford Fehlberg [redacted]
Sent: Wednesday, 9 September 2020 9:36 AM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager,

My name is Trafford Fehlberg and I [redacted]. While the below information has been copied and pasted, I wanted to reiterate that this is only so because I agree with the below completely.

Thank you for taking the time to hear our submissions and considerations **against the proposed Dunoon Dam**. I believe our region and council has the capacity to lead the way in smarter water options.

Kind regards,
Dr Trafford Fehlberg
BMED, FRACS
[redacted]

Please see below submission:

Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date. The community appreciates it. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.

Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)

Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)

Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)

Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8)

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history(10)

Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater

Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes
Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to "Local Government Factsheets".
Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy : preferred options, Rous County Council, Lismore.
Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water, Institute for Sustainable Futures, Sydney.
Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide.
Windhoek Goreangab Operating Company (Pty) Ltd 2020,Our history | Wingoc, Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

[redacted]

From: Jessie Vintila [redacted]
Sent: Wednesday, 9 September 2020 9:55 AM
To: [redacted]
Records
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Jessie Vintila
[redacted]

Dear Rous Councillors and General Manager,

Re: The proposed Dunoon Dam within the Future Water Project 2060

I have learned that there are many and serious questions surrounding this Project and urge you to put all planning on hold until these questions are resolved.

1 What is the actual projected need for increased water in the relevant time period? There is dispute about the population increase projections, and the potential to reduce consumption with efficiency measures.

2 Water efficiency measures are increasingly popular globally, mitigating the need for more and more supply, developing more sustainable usage practices across industry and households. What has been done here to keep up with best practice around efficiency?

3 Destruction of habitat, rare rainforest, and Indigenous cultural sites, and possible flooding are outcomes of this project. Also, many years of visual and sound pollution whilst construction takes place. What water supply alternatives have been explored to avoid or reduce these negative impacts? If none have been explored, why not? Globally, dams are not seen as modern solutions to water supply issues for these and other reasons. Are there vested interests creating a bias towards this option over others? Aren't we the community and rate payers entitled to infrastructure decisions made in a fair forum that ensures best outcomes for as many parties as possible?

4 The projected cost of water due to the expense of this project is reportedly up to 4 times current rates, for consumers. Again, what alternatives have been explored to mitigate against water becoming much less affordable for all of us?

I trust that you will fully consider these important questions and issues. I appreciate that this is a complex and challenging area to be managing,

Thankyou so much for the hard work that you do on all of our behalves,

Yours sincerely,

Jessie Vintila

[redacted]

From: Jessie Vintila [redacted]
Sent: Wednesday, 9 September 2020 10:35 AM
To: [redacted]
Records
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Emma Royle
[redacted]

Dear Rous Councillors and General Manager,

Re: The proposed Dunoon Dam within the Future Water Project 2060

I have serious concerns regarding the proposed Dunoon Dam.

1. **Destruction of rare rainforest.** My understanding is that the proposed dam will flood 7 hectares of rare rainforest. As a community I believe it is our responsibility to avoid development that is destructive to our natural environment wherever possible.
2. **Extreme increase in water prices.** The proposed dam will be funded by increased water costs. As I rate payer, I believe many people won't be able to afford to pay up to 4 times the current rate for water.
3. **Outdated water solution.** What alternatives have been considered? Have they been fully costed? If yes, please make this information available to the community.
4. **Is greater water supply necessary?** My understanding is that greater water supply is needed to support projected population growth. However there is dispute about the numbers used for the dam proposal. Has increased water efficiency been fully considered?
5. **Could all new development be required to be self sufficient regarding water?** As community leaders I believe it is your responsibility to create systems that enable a more sustainable future.
6. **Flooding of Indigenous burial site.** It's not appropriate to flood a burial site. I encourage you to give this concern the same regard as if it were a white Australian cemetery in question.

Thankyou for considering my concerns seiously,

Yours sincerely,

Emma Royle

[redacted]

From: paula williams [redacted]
Sent: Wednesday, 9 September 2020 11:07 AM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager,

Thank you for supporting the extension of the submission date. I line in [redacted] and the proposed dam has only recently come to my awareness.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance.
- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)
- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
- Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- The small population increase predicted for the four Rous-supplied councils of 12,720 between 2020-2060 does not justify such a large and destructive dam.
- Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- An investment in system-wide water efficiency and strong demand management.
- Water re-use in various ways, including Purified Recycled Potable water.
- Water harvesting (urban runoff; rain tanks)

Regards,

Paula Williams

[redacted]

[redacted]

From: Miranda Mills [redacted]
Sent: Wednesday, 9 September 2020 11:37 AM
To: Records
Subject: The proposed Dunoon Dam within the Future Water Project 2060

To Rous County Council,

Re: The proposed Dunoon Dam within the Future Water Project 2060

As a concerned citizen and ratepayer in the [redacted], I am compelled to make this submission on the Channon/Dunoon Dam, because we are dealing with the same issues here in [redacted]. Our natural environment is too precious to sacrifice for Big Dam developments.

I DO NOT SUPPORT the proposed dam at Dunoon.

How dare you impose such a huge financial burden on ratepayers without adequately informing them and without facility for a democratic public assessment. If ratepayers were aware of the proposal, informed of the cost, and if they were asked in an open forum, then the decision to cancel the dam idea would be clear. A new Big Dam is the most expensive option and unnecessary.

Before this decision process goes one step further an efficiency audit of systemic waste in pipes and facilities must be carried out, improvements identified and fixed. Other options to increase water availability such as water re-use and water harvesting must be put on the table. In the 21st century water management means more than Big Dams.

If you are worried about a drought: buy a tank! the simplest and cheapest solution.

The proposition to destroy beautiful, unique, rainforested gorge, habitat for endangered species, is unconscionable.

Ignoring the input of local Widjabul people is disrespectful in the extreme.

Your sincerely,

Ms Miranda Mills

[redacted]

[redacted]

[redacted]

From: Susanne Ulyatt [redacted]
Sent: Wednesday, 9 September 2020 12:49 PM
To: Records
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Councillors
Whilst I appreciate the need for water in our community and Rous Waters effort to provide this, I DO NOT support the proposed Dunoon Dam.
I am very concerned about the chosen location and I cannot support this project.

The chosen location is of significant importance for many species of wildlife, including threatened species. The destruction of any Lowland Rainforest and remnant "Big Scrub" vegetation is not acceptable.
Koalas in particular of which we last year in the bushfires lost over 70% of the population, stand to lose habitat vital for their survival. I am sure you would be aware of the NSW parliamentary inquiry where it was found that koalas are likely to become extinct in the wild in NSW prior to 2050 without urgent intervention to stop the destruction of their habitat.

IWCM_Development_Assessment_of_Augmentation_Scenarios states clearly that: *The dam would remove important habitat features and local linkages for threatened fauna species. In particular, movement pathways for the threatened Koala will be impeded from the installation of the dam wall, spillway and the inundation area. Loss of feeding resources for the listed Grey-headed Flying Fox, Rose-crowned Fruit-dove and White-eared Monarch and nesting resources for migratory birds from the removal of rainforest and Camphor laurel communities is also likely to be significant within the study area.*
Further, the loss of foraging resources provided within the dry sclerophyll forests, which are rare in the region, will impact on the threatened Glossy-black Cockatoo and Scarlet Robin. Loveridges Frog (Philoria loveridgei) was also found just outside the footprint of the proposed dam at a lower elevation and more southerly point than has been previously recorded. Habitat for this species may also be impacted by the proposal (SMEC, 2011).
The works will also remove threatened flora species within the inundation and dam infrastructure areas and their habitat. There is also the potential for indirect impacts through key threatening processes such as the spread of Lantana camera and dieback caused by the root-rot fungus (Phytophthora cinnamomi) (SMEC, 2011).
That assessment was made a long time ago , even then there was great concern for the loss of vital habitat .

Now more than ever we must consider the impact the destruction of this vital habitat will cause.
Last year billions of animals lost their lives and vital habitat was lost. How can we posibly consider allowing more habitat loss by agreeing to this site location. We must look at ways of saving what little vital habitat is still standing.
I urge you to reconsider and look at other options; I cannot support the proposal for this Dam.

Susanne Ulyatt
[redacted]

[redacted]

From: The Channon P and C [redacted]
Sent: Wednesday, 9 September 2020 1:00 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

The Channon Primary School P&C Committee

[redacted]

[redacted]

[redacted]

09/09/2020

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I am writing to you on behalf of The Channon Primary School P&C

Our families have enjoyed the rainforests, creeks and valleys in the northern NSW region for many years.

We are very concerned about the impact that your proposed dam will have on our school. The dam's proximity and the infrastructure development required, will necessitate a great change to the villages where our school is located. We cannot find any information in your proposal about safeguards for our classrooms, e.g. managing traffic, dust and noise during school hours so that it does not impact on our school.

Our school is unique, very small and supporting a number of children with special needs who will struggle to cope with changes associated with building the Rous mega dam. Many families have chosen our school because the class sizes, the quiet location, and the lack of pollution better supper their children. Has the Department of Education

been notified about Rous' plan, the noise, the dust, and the increased cost of water in the region that will result? Will they be able to support our children to engage in learning locally and have there been plans for this?

We are also concerned about the desecration of Indigenous culture: The Channon/Dunoon has an extensive and rich cultural landscape belonging to the Widjabal-Wiyabal People of the Bundjalung nation. Our families value the education this supports at the local schools. The unique geology of "Basalt Meets Sandstone" as this site lends itself to a meeting place for tool building, rich fertile land and sanctuary. The waterholes, trees and rocks of the Rocky Creek landscape tell one of an intact and well documented Australian dream-time story in the epic battle of goanna (Ngumarhl) and snake (Ngoonjbear) which formed the Northern Rivers waterways and headlands. Our school students, like Local Councillors, pay their respects to the Bundjalung People and Ancestors' safe custodianship of our lands and waterways over tens-of-thousands of years.

The Rous Reconciliation Action Plan (RAP) 2017 is to be commended in their recent efforts:: "Bundjalung people have lived in the region for many thousands of years in a sustainable relationship with the natural environment. The water catchment areas managed by Rous County Council are a part of the natural landscape that forms the identity, culture, spirituality and resource base for the Widjabal/Wiyabal people of the Bundjalung nation. Despite the significant changes of the past 200 years, the Widjabal/Wiyabal people still maintain a responsibility and deep relationship with the land and water. Rous County Council acknowledges this relationship and deeply values their traditional laws, knowledge and lessons about places and sustainability. Rous County Council conducts all business activities in accordance with its values of Integrity, Commitment, Trust, Social Responsibility, and Accountability."

[https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-NWB-13-07-78]

Despite these well stated intentions, should the dam proceed, important Indigenous archeological sites, burial grounds, creation waterholes and artefacts would be destroyed. [Cultural Heritage Impact Assessment, 2011]

Widjabal/Wiyabal representatives such as Elder John Roberts and Noel King's position on this project remains a clear "NO DAM!" and serious concerns as to the failures in engagement since 1989 are to be tabled.

We fully support their position on strongly rejecting this dam issue.

The parents and teachers of our school place high regard in the ecology of our region. Many of them choose to live in the area because of the pristine, protected and valued forest, and are committed to engage in and support smart water management and water efficiency at our school and in our homes. We value the gorges and their communities and are very concerned about the:-

● Destruction of beautiful Whian Whian Gorge, the second largest remnant of the 99% cleared Gondwanna Sub-Tropical Rainforest. At more than 60ha this represents over 10% of this precious habitat and is 40% the size of the World Heritage recognised Big Scrub Flora Reserve to which it connects geographically, 7 kms downstream from the Rocky Creek Dam.

● Destruction of beautiful The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species.

[Terrestrial Ecology Impact Assessment, 2011]

● Flooding of half of the popular Whian Whian Falls recreational area. This involves Aboriginal women's ceremonial pools, and in high rainfall periods would make the main Falls unusable.

● Accelerate extinction of a multitude of vulnerable species. Extinction level pressures on 3 vulnerable fish species due to destruction of 6kms and genetic islanding of over 18 kms of migratory native fish habitat. Extinction pressure on 19 threatened plant species, and 24 threatened fauna species. [As recorded within the 2011 Rous Ecological Surveys].

● Koala habitat and important "corridors" connecting Whian Whian, Dunoon and The Channon populations.

We understand that there are plans to support sport and recreation use of the proposed dam. We prefer to access the creek as it is, engaging our children with the wondrous creatures that live as our kids “fossick”, paddle and picnic under the beautiful trees..

For a picture journey through part of this incredible landscape please see David Lowe’s amazing photography:

https://www.flickr.com/photos/davidlowe1970/albums/72157715831462108?fbclid=IwAR3nK782KFszAMwn_74HKC02f-BsGKbYCZmwyWg0GYrSAGmaU0UHZCaqKgo

Yours faithfully,

Trudy Crawley

President of The Channon Primary School P&C.

[redacted]

From: The Channon P and C [redacted]
Sent: Wednesday, 9 September 2020 1:00 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

The Channon Primary School P&C Committee

[redacted]

[redacted]

[redacted]

09/09/2020

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I am writing to you on behalf of The Channon Primary School P&C

Our families have enjoyed the rainforests, creeks and valleys in the northern NSW region for many years.

We are very concerned about the impact that your proposed dam will have on our school. The dam's proximity and the infrastructure development required, will necessitate a great change to the villages where our school is located. We cannot find any information in your proposal about safeguards for our classrooms, e.g. managing traffic, dust and noise during school hours so that it does not impact on our school.

Our school is unique, very small and supporting a number of children with special needs who will struggle to cope with changes associated with building the Rous mega dam. Many families have chosen our school because the class sizes, the quiet location, and the lack of pollution better supper their children. Has the Department of Education

been notified about Rous' plan, the noise, the dust, and the increased cost of water in the region that will result? Will they be able to support our children to engage in learning locally and have there been plans for this?

We are also concerned about the desecration of Indigenous culture: The Channon/Dunoon has an extensive and rich cultural landscape belonging to the Widjabal-Wiyabal People of the Bundjalung nation. Our families value the education this supports at the local schools. The unique geology of "Basalt Meets Sandstone" as this site lends itself to a meeting place for tool building, rich fertile land and sanctuary. The waterholes, trees and rocks of the Rocky Creek landscape tell one of an intact and well documented Australian dream-time story in the epic battle of goanna (Ngumarhl) and snake (Ngoonjbear) which formed the Northern Rivers waterways and headlands. Our school students, like Local Councillors, pay their respects to the Bundjalung People and Ancestors' safe custodianship of our lands and waterways over tens-of-thousands of years.

The Rous Reconciliation Action Plan (RAP) 2017 is to be commended in their recent efforts:: "Bundjalung people have lived in the region for many thousands of years in a sustainable relationship with the natural environment. The water catchment areas managed by Rous County Council are a part of the natural landscape that forms the identity, culture, spirituality and resource base for the Widjabal/Wiyabal people of the Bundjalung nation. Despite the significant changes of the past 200 years, the Widjabal/Wiyabal people still maintain a responsibility and deep relationship with the land and water. Rous County Council acknowledges this relationship and deeply values their traditional laws, knowledge and lessons about places and sustainability. Rous County Council conducts all business activities in accordance with its values of Integrity, Commitment, Trust, Social Responsibility, and Accountability."

[https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-NWB-13-07-78]

Despite these well stated intentions, should the dam proceed, important Indigenous archeological sites, burial grounds, creation waterholes and artefacts would be destroyed. [Cultural Heritage Impact Assessment, 2011]

Widjabal/Wiyabal representatives such as Elder John Roberts and Noel King's position on this project remains a clear "NO DAM!" and serious concerns as to the failures in engagement since 1989 are to be tabled.

We fully support their position on strongly rejecting this dam issue.

The parents and teachers of our school place high regard in the ecology of our region. Many of them choose to live in the area because of the pristine, protected and valued forest, and are committed to engage in and support smart water management and water efficiency at our school and in our homes. We value the gorges and their communities and are very concerned about the:-

● Destruction of beautiful Whian Whian Gorge, the second largest remnant of the 99% cleared Gondwanna Sub-Tropical Rainforest. At more than 60ha this represents over 10% of this precious habitat and is 40% the size of the World Heritage recognised Big Scrub Flora Reserve to which it connects geographically, 7 kms downstream from the Rocky Creek Dam.

● Destruction of beautiful The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species.

[Terrestrial Ecology Impact Assessment, 2011]

● Flooding of half of the popular Whian Whian Falls recreational area. This involves Aboriginal women's ceremonial pools, and in high rainfall periods would make the main Falls unusable.

● Accelerate extinction of a multitude of vulnerable species. Extinction level pressures on 3 vulnerable fish species due to destruction of 6kms and genetic islanding of over 18 kms of migratory native fish habitat. Extinction pressure on 19 threatened plant species, and 24 threatened fauna species. [As recorded within the 2011 Rous Ecological Surveys].

● Koala habitat and important "corridors" connecting Whian Whian, Dunoon and The Channon populations.

We understand that there are plans to support sport and recreation use of the proposed dam. We prefer to access the creek as it is, engaging our children with the wondrous creatures that live as our kids “fossick”, paddle and picnic under the beautiful trees..

For a picture journey through part of this incredible landscape please see David Lowe’s amazing photography:

https://www.flickr.com/photos/davidlowe1970/albums/72157715831462108?fbclid=IwAR3nK782KFszAMwn_74HKC02f-BsGKbYCZmwyWg0GYrSAGmaU0UHZCaqKgo

Yours faithfully,

Trudy Crawley

President of The Channon Primary School P&C.

[redacted]

From: Sally Colin-James [redacted]
Sent: Wednesday, 9 September 2020 1:58 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Sally Colin-James
[redacted]

9th September 2020

Rous County Council
Lismore
NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

Thank you for supporting the extension of the submission date. I acknowledge the complexity of water management in our region.

That being said, I am a long-time resident of [redacted] and I am, as are numerous residents of the [redacted] gravely concerned for the future of our water supply in the Shire and in no way do I believe that the proposed Dunoon dam is the answer for the sustainable management of our precious water resources. In fact, it is my firm belief that the destruction such a venture would cause would so far outweigh any scant short-term solutions that any statement that tries to persuade locals of a dam's validity is an embarrassment to those who make it and an insult to the collective intellect and environmental spirit of Byron Shire residents.

The idea of a venture that would cause devastation to our irreplaceable rainforest and indigenous history along with the blatant oversight that there are cheaper, more efficient strategies that could bring about a system-wide overhaul of past inefficiencies and produce truly long-term results is both worrying and puzzling.

Surely there exists the company clout and intellect to perform due diligence on more robust models such that the Northern Rivers could demonstrate a leading-edge approach to water management that is both wholistic, ethical, environmentally sound and raises the bar on water management standards?

It is my plea that you consider this as an opportunity to represent yourselves as forward thinking - and even pioneering - and utilise the vast amount of material at hand to produce a solution for water management that does not compromise the future of our land and Shire in the way a dam most surely will.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focusing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) *(1)*
- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)*(2)*. Ongoing disregard for First Nations' heritage.
- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)*(3)* . Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist) Council s are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-t he-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4) Rous is required to *avoid* this destruction because there are economically viable and more effective solutions.
- Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur , diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > scroll down to "Local Government Factsheets".(5)
- Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)
- Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives: I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has *not* costed this in creating their future water plan) Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.*(7) (8)* Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.*(9)* (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
- Water re-use in various ways, including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806*(9)*Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history*(10)*

- Water harvesting (urban runoff; rain tanks):Water tanks on all new (and existing) developments.*(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.* The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs." Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.*(12)* https://www.yourhome.gov.au/water/rainwater
- Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- Groundwater, where this is environmentally safe The Australian government provides a lot of information on the ecological impacts and groundwater usage.*(13)* https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes:

. (1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

. (2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011

. (3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011

. (4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.

. (5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections'*, Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > Scroll down to "Local Government Factsheets".

. (6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.

. (7) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options* , Rous County Council, Lismore.

. (8) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water* , Institute for Sustainable Futures, Sydney.

. (9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

(10)Kahn, Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?,* Water Research Australia Limited, Adelaide.

(11)WindhoekGoreangabOperatingCompany(Pty)Ltd2020 *,Ourhistory|Wingoc,*V eoliaEnvironment, Windhoek, viewed 3 August 2020, < https://www.wingoc.com.na/ >(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).

(13)Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home* , Canberra, viewed 3 August 2020, < https://www.yourhome.gov.au/water/rainwater >

(14)Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <

https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown >

Sincerely

Dr Sally Colin-James
writer, philosopher, natural wellbeing advocate

[redacted]

From: [redacted]
Sent: Wednesday, 9 September 2020 2:16 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Dear Rous Councillors and General Manager

My name is Renee Borrow and I have [redacted] for more than 20 years [redacted]

As an environmental scientist, I am deeply concerned by the proposed Dunoon Dam and the intended flooding of an endangered ecological community. Offsets will not adequately compensate for such rare rainforest as that which is found at The Channon Gorge. Destruction of this unique rainforest will remove essential habitat for endangered wildlife and, following such a devastating bushfire season late last year where large tracts of rainforest were destroyed/damaged, how can we allow this to occur?

I am also deeply concerned that Indigenous cultural sites will be destroyed. There are alternatives....

My family do not rely on town water. Instead we use only tank water. I am not suggesting that we remove the population from accessing town water. I am, however, suggesting that money should be invested in fixing any leaks within the current system, conduct water audits on all publicly owned buildings, provide greater incentives for private property owners to reduce water wastage and subsidise rain tanks for current and future dwellings.

I do acknowledge the complexity of what Rous does to provide water to our region but I am also confident that we can sustain our future expanding population by putting some simple measures in place. If Sydney can do it, so can we.

I agree will all points made below:-

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

• **Lost opportunity to invest in system-wide water efficiency** - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) [1]

• **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

● **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.

● **Destruction of important Indigenous cultural heritage,** including burial sites (Cultural Heritage Impact Assessment, 2011)[2]. Ongoing disregard for First Nations' heritage.

● **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest** (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)[3].

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-t he-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. [4]

Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.

● **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

● **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

● **The small population increase** predicted for the four Rous-supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks being **an expensive white dinosaur**, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projecti ons> scroll down to "Local Government Factsheets".[5]

● **Catastrophic flooding downstream in worst floods,** particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)[6]

● **Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.**

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

● **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. (We understand Rous has *not* costed this in creating their future water plan) Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.[7] [8] Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and

economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.[9](Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

● **Water re-use in various ways,** including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806[9] Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history[10]

● **Water harvesting** (urban runoff; rain tanks): Water tanks on all new (and existing) developments.[11] *This builds community resilience - much needed, as the recent extreme bushfire season has shown.*

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

> Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[12] https://www.yourhome.gov.au/water/rainwater

● **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

● **Groundwater, where this is environmentally safe** The Australian government provides a lot of information on the ecological impacts and groundwater usage.[13]
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc

https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0 (2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011 (3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011 (4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03

August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney,

viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to "Local Government Factsheets". (6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia. (7) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand*

Management Strategy : preferred options, Rous County Council, Lismore. (8) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for*

Hunter Water, Institute for Sustainable Futures, Sydney. (9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides) (10)Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global*

experience?, Water Research Australia Limited, Adelaide. (11)Windhoek Goreangab Operating Company (Pty) Ltd 2020*,Our history* | *Wingoc,* Veolia Environment,

Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/> (12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater

tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous). (13)Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater* | *Your*

home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater> (14)Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown?* | *Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-dr awdown>

[redacted]

From: Barnaby Lund [redacted]
Sent: Wednesday, 9 September 2020 2:18 PM
To: Records
Subject: The Proposed Dunoon Dam within the Future Water Project 2060

CYBER SECURITY WARNING ? This message is from an external sender ? be cautious, particularly with hyperlinks and/or attachments.

To whom it may concern,

My submission:

I do not support the proposed dam. The environmental, indigenous cultural heritage and rural farming values of the area are too great be destroyed.

The dam is unnecessary and unwanted. Increasing water efficiency at infrastructure and property levels will be far more ecologically and economically viable and will not result in a four fold increase in water costs to the community.

Yours sincerely,

Barnaby Lund
[redacted]

[redacted]

From: Lucy White [redacted]
Sent: Wednesday, 9 September 2020 2:22 PM
To: Records
Cc: [redacted]
Subject: THE PROPOSED DUNOON DAM WITHIN THE FUTURE WATER PROJECT 2060

LUCY WHITE
[redacted]

9th September 2020
Rous County Council
LISMORE NSW 2480
<COUNCIL@ROUS.NSW.GOV.AU>

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

I have resided in this area for nearly twenty years and care passionately about our natural environment. The building of this dam will be destructive to sacred aboriginal sites, to remnant sections of the Big Scrub Rainforest and to local flora and fauna. The construction of a dam it is not the ideal long term water management strategy needed in this area. There is no guarantee that the building of this dam is a total solution to a water management strategy and providing people with financial assistance to implement water-saving measures (eg. appliances and equipment) would be the first step to a water management policy. Thank you for supporting the extension of the submission date. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1).

- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011) (2).

Ongoing disregard for First Nations' heritage.

● Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) (3).
Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments (4).

Rous is required to avoid this destruction because there are economically viable and more effective solutions.

● Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
● Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
● The small population increase predicted for the four Rous-supplied councils of 12,720 (5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets". (5)

● Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011) (6)

● Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.
The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.
● An investment in system-wide water efficiency and strong demand management.
Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply. (7) (8)

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible. (9)
(Stuart White, 2020)

www.bit.ly/Prof-Stuart-White-Rous-slides)
● Water re-use in various ways, including Purified Recycled Potable water.

A wealth of global research and experience already exists regarding potable reuse of water as set out Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806
(9)

Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history
(10)

● Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.

(11) This builds community resilience -

much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.

(12) https://www.yourhome.gov.au/water/rainwater

● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
● Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.
(13)

https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground
water-drawdown
With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam

PLEASE DON'T BUILD THE DAM!

Lucy White

[redacted]

From: Adam Jung [redacted]
Sent: Wednesday, 9 September 2020 2:29 PM
To: Records
Cc: [redacted].au
Subject: The proposed Dunoon Dam within the Future Water Project 2060

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Adam Jung
[redacted]

Dear Rous Councillors and General Manager,

Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date. The community appreciates it. We also ackno wledge the complexity of what Rous does to provide water to our region.

About me:

I have lived in Dorroughby for 45 years with my wife and four kids. I have seen the area grow over that time and with that the demand on the natural environment has increased . A dam would give reason to sell more water. Would encourage more development more people.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

• Higher prices for consumers due to a 4x increase in the cost of water. In response to a question from councillor Va nessa Ekins, Mr Rudd said he expected a fourfold increase in the cost of supplying water if the dam is built. [Phil Rud d, Rous general manager]

• The small population increase predicted for the four Rous-supplied councils of 12,720 (5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting e xpenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov. au/Research-and-Demography/ Population-projections/ Projections> scroll down to "Local Government Factsheets".(5)

• Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in co nsumption for 25 years. (Metropolitan Water Plan 2006, NSW Government) (1)

• The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our syste m fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

● The dam would encourage continued inefficient and often wasteful water management by local governments. The y would have no incentive to do things differently.

● Destruction of beautiful Whian Whian Gorge, the second largest remnant of the 99% cleared Gondwana Sub-Tropical Rainforest. At more than 60ha this represents over 10% of this precious habitat and is 40% the size of the World Heritage recognised Big Scrub Flora Reserve to which it connects geographically, 7 kms downstream from the Rocky Creek Dam.

● Destruction of beautiful The Channon Gorge and its endangered ecological community of lowland rainforest (inclu ding regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species.

[Terrestrial Ecology Impact Assessment, 2011]

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone." 'Offsetting' with similar plantings is problematic because the type of vegetation offered as recompense is never equi valent. This example is worse than most." [Nan Nicholson, botanist]

Councils are required under State planning regulations to:

1. “Focus development to areas of least biodiversity sensitivity in the region and implement the ‘avoid, minimise, off set’ hierarchy to biodiversity, including areas of high environmental value.”

[NSW Department of Planning, Industry and Environment 2019, ‘Delivering the plan’, Sydney, viewed 03August2020 https://www.planning.nsw.gov. au/Plans-for-your-area/ Regional-Plans/North-Coast/ Delivering-the-plan],

2. Enhance biodiversity coastal and aquatic habitats and water catchments. (4)Rous is required to avoid this destruct ion because there are economically viable and more effective solutions.

● Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flo ws Assessment 2011)(6)

● Flooding of half of the popular Whian Whian Falls recreational area. This involves Aboriginal women's ceremonial pools, and in high rainfall periods would make the main Falls unusable.

● Accelerate extinction of a multitude of vulnerable species. Extinction level pressures on 3 vulnerable fish species due to destruction of 6kms and genetic islanding of over 18 kms of migratory native fish habitat. Extinction pressure on 19 threatened plant species, and 24 threatened fauna species. [As recorded within the 2011 Rous Ecological Surv eys].

● Koala habitat and important "corridors" connecting Whian Whian, Dunoon and The Channon populations.

● Geotechnical considerations: basalt soil landslides and sandstone leakage with potential dam failure & massive cos t blowouts.

[Interview with Michael Mackenzie, Rous Engineer on 20.08.20]

● Desecrating Indigenous culture: The Channon/Dunoon has an extensive and rich cultural landscape belonging to th e Widjabal-
Wiyabal People of the Bundjalung nation. The unique geology of "Basalt Meets Sandstone" at this site lends itself to a meeting place for tool building, rich fertile land and sanctuary. The waterholes, trees and rocks of the Rocky Creek landscape tell one of an intact and well documented Australian dream-
time story in the epic battle of goanna (Ngumarhl) and snake (Ngoonjbear) which formed the Northern Rivers water ways and headlands. Local Preschools and Councillors alike pay their respects to the Bundjalung People and Ancesto rs' safe custodianship of our lands and waterways over tens-of-thousands of years.

The Rous Reconciliation Action Plan (RAP) 2017 is to be commended in their recent efforts:: "Bundjalung people hav e lived in the region for many thousands of years in a sustainable relationship with the natural environment. The wa ter catchment areas managed by Rous County Council are a part of the natural landscape that forms the identity, cul ture, spirituality and resource base for the Widjabal/Wiyabal people of the Bundjalung nation. Despite the significan t changes of the past 200 years, the Widjabal/Wiyabal people still maintain a responsibility and deep relationship wit h the land and water. Rous County Council acknowledges this relationship and deeply values their traditional laws, k nowledge and lessons about places and sustainability. Rous County Council conducts all business activities in accord ance with its values of Integrity, Commitment, Trust, Social Responsibility, and Accountability."

[https://rous.nsw.gov.au/cp_ themes/default/page.asp?p=DOC- NWB-13-07-78]

Despite these well stated intentions, should the dam proceed, important Indigenous archaeological sites, burial grou nds, creation waterholes and artefacts would be destroyed. [Cultural Heritage Impact Assessment, 2011]

Widjabal/Wiyabal representatives such as Elder John Roberts and Noel King's position on this project remains a clear "NO DAM!" and serious concerns as to the failures in engagement since 1989 are to be tabled.

I therefore fully support their position on strongly rejecting this dam issue.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on ren ewable and sustainable resource use. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

● An investment in system-
wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understa nd Rous has not costed this in creating their future water plan). Existing research over the past decade consistently fi nds that the best value for money investment in water supply comes from demand management and identifying savi ngs within the existing supply. (7) (8)

● Water reuse in various ways, including Purified Recycled Potable water. A wealth of global research and experienc e already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reu se: What can Australia learn from global experience?

https://www.waterra.com.au/ publications/document-
search/? download=1806 (9) Example: The city of Windhoek in Namibia in Southern Africa has been using purified re cycled water for 30 years using advanced technology. https://www.wingoc.com.na/our- history (10)

● Water harvesting via urban run-
off & rainwater tanks: Water tanks on all new (and existing) developments. Remove the rubbish law that prevents ur ban use of rainwater in the Ballina Shire. (11) This builds much needed community resilience, as the recent extreme bushfire season has shown. The cost of a 22,000L rainwater tank is only $2,500. If this were spread over each new 2 person household (est 13,000 pop by 2060) the cost would be a mere $16 million, and combined with automatic-mains top-up, can provide 100% reduction in mains water use!
The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by u p to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environme ntal flows in rivers; reduce infrastructure operating costs." Rainwater harvesting also decreases storm water run-off, thereby helping to reduce local flooding and scouring of creeks.

(12) https://www.yourhome.gov.au/ water/rainwater

● Deep underground water storage with surface run-off integration.

[https://www.abc.net.au/news/ 2020-03-04/water-banking- aquifers-australia-facing- future-drought/12009702]

[Dillon, P, Stuyfzand, P, Grischek, T et al 2019, 'Sixty years of global progress in managed aquifer recharge', Hydrogeology Journal, vol. 27, no. 1, pp. 1-30.]

[Ross, A 2017, 'Speeding the transition towards integrated groundwater and surface water management in Australia', Journal of Hydrology, vol. Article in press.]

● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought. Multiple sources of water rather than putting all our "eggs in one basket" (ie: million$), allows us to route around any points of failure in the water system.

● Groundwater, where this is environmentally safe The Australian government provides a lot of information on the ecological impacts and groundwater usage. (13) The Regional Investment Corporation (RIC) which administers the National Water Infrastructure Loan Facility allow up to 49% lending towards: groundwater and managed aquifer recharge supply schemes and water treatment, including desalination, storage and reuse. [https://www.environment.gov.au/water/publications/what- are-the-ecological-impacts-of- groundwater-drawdown]

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

For a picture journey through part of this incredible landscape please see David Lowe’s amazing photography of the threatened Channon Gorge:

https://www.flickr.com/photos/ davidlowe1970/albums/ 72157715831462108?fbclid= IwAR3nK782KFszAMwn_74HKC02f- BsGKbYCZmwyWg0GYrSAGmaU0UHZCaq Kgo

Kind regards,

Adam Jung

[redacted]

From: Martin Oliver [redacted]
Sent: Wednesday, 9 September 2020 4:18 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Martin Oliver
[redacted]

Dear Rous Councillors and General Manager,

I would like to object to the proposed dam, for the following reasons:

- The relatively small anticipated population increase for Rous-supplied councils does not justify such a large dam.
- However, I am concerned that as a piece of infrastructure, it has the capacity to drive higher-than-modelled future population growth, in turn compromising the region's unique environment.
- Loss of unique rainforest. The area proposed to be flooded contains endangered lowland rainforest, including regionally rare warm temperate rainforest on sandstone. Offsetting is not sufficient to compensate for this major loss.
- The destruction of indigenous heritage, including important burial sites, and the opposition of many Aboriginal people to the proposal.
- If the dam is built, there would be a disincentive to apply water-efficient solutions, which may in turn require increased energy for showering and water-pumping, thereby exacerbating climate change.
- Disruptive impacts on the Dunoon and The Channon communities from construction.
- Ongoing noise from the pump house, which to my understanding would be close to dwellings in The Channon.
- A huge increase in water costs. I understand that if the dam goes ahead then local water users would be facing four-fold increases in water charges.
- Instead, I believe that savings can be achieved via solutions such such as more proactively identifying water leaks, publicising water tank incentives, aggressively ramping up water tank use, water harvesting measures, the use of purified recycled potable water, and other water-efficiency measures, either individually or in combination.

In summary, I believe that large dams such as this are 20th century technology, and that better alternatives now exist.

Yours sincerely,

Martin Oliver

[redacted]

From: raine sharpe [redacted]
Sent: Wednesday, 9 September 2020 6:31 PM
To: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Raine sharpe
[redacted]

Future Water Project 2060 - Feedback

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

It does make sense to store as much water as possible, however does that mean build a big dam and take out endangered animals habitats (including koalas).

We could be using recycled water to water gardens and flush toilets, building our own rainwater tanks... for instance, we have none! I don't know anyone in Ocean Shores with one! How silly is that??? We could have composting toilets! Dams are a last resort.

- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)
- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.
- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-

Coast/Delivering-t he-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

● Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
● Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
● The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projecti ons> scroll down to "Local Government Factsheets".(5)
● Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)
● Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.
I SUPPORT these alternatives:
I believe we need to take action on a suite of smart water options and proven alternatives.
The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.
● An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8)
Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
● Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history(10)
● Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater
● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
● Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13) https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown
With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to "Local Government Factsheets".
(6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
(7) The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy : preferred options, Rous County Council, Lismore.
(8) Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water, Institute for Sustainable Futures, Sydney.
(9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
(10)Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide. (11)WindhoekGoreangabOperatingCompany(Pty)Ltd2020 ,Ourhistory|Wingoc,V eoliaEnvironment,
Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, < https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-dr awdown >

Yours sincerely
Raine sharpe

Sent from my iPhone Raine Sharpe

[redacted]

From: [redacted]
Sent: Wednesday, 9 September 2020 7:21 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

Thank you for the opportunity to provide a submission to the proposed Dunoon Dam within the Future Water Project 2060.

I live in [redacted] beside the [redacted] wetland know as [redacted]. I am involved in [redacted] land care and appreciate the support of Rous in the original project which saw this site start to return to a healthier state. My family are committed to the preservation of native habitat, Aboriginal Culture and the wise use of water. We are just about to install our third water tank on our property in an attempt to draw less from our current dam.

Thank you for supporting the extension of the submission date. I also acknowledge the complexity of what Rous does to provide water to our region.

I **DO NOT** support the proposed Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency** - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government)*(1)*

- **The 21st century is about a suite of smart water options**. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

- **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.

- **Destruction of important Indigenous cultural heritage**, including burial sites (Cultural Heritage Impact Assessment, 2011) *(2)*. Ongoing disregard for First Nations' heritage.

- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest** (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) *(3)*.

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: “Focus development to areas of least biodiversity sensitivity in the region and implement the ‘avoid, minimise, offset’ hierarchy to biodiversity, including areas of high environmental value.” NSW Department of Planning, Industry and Environment 2019, ‘Delivering the plan’, Sydney, viewed 03 August 2020 https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. *(4)*

Rous is required to **avoid** this destruction because there are economically viable and more effective solutions.

● **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

● **Higher prices for consumers due to a 4x increase in the cost of water**. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

● **The small population increase** predicted for the four Rous-supplied councils of 12,720 *(5)* between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, ‘NSW population projections ’, Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to “Local Government Factsheets”.*(5)*

● **Catastrophic flooding downstream in worst floods**, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011) *(6)*

● **Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset**.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

● **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best ‘bang-for-buck’ investment in water supply comes from demand management and identifying savings within the existing supply. (7) (8)
Professor Stuart White from UTS has provided a detailed and costed proposal “The Rous Sustainable Water Program” which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.*(9)* (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

● **Water re-use in various ways**, including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia’s report, Potable Water Reuse: What can Australia learn from global experience?
https://www.waterra.com.au/publications/document-search/?download=1806 *(9)*
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history *(10)*

● **Water harvesting** (urban runoff; rain tanks): Water tanks on all new (and existing) developments. *(11) This builds community resilience -much needed, as the recent extreme bushfire season has shown.*

The Australian government advises that: “Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining

environmental flows in rivers; reduce infrastructure operating costs." Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks. *(12)*
https://www.yourhome.gov.au/water/rainwater

● **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

● **Groundwater, where this is environmentally safe**
The Australian government provides a lot of information on the ecological impacts and groundwater usage. *(13)*
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes
(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
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(11)Windhoek Goreangab Operating Company (Pty) Ltd 2020,Our history | Wingoc, Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

Yours Sincerely
Vicki Findlay
[redacted]

[redacted]

From: Thomas Eichmann [redacted]
Sent: Wednesday, 9 September 2020 7:25 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date. The community appreciates it. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.

Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of

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Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)

Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)

Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8)

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history(10)

Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater

Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Thank you for reading, and for your consideration

References and Notes

Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc

< https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0>

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[redacted]

From: Denise Nagorcka [redacted]
Sent: Wednesday, 9 September 2020 7:33 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Rous County Council,
[redacted]

Dear Rous County Councillors and Rous County General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

I understand that Rous County Council has the complex responsibility to ensure water supply in this region. Thank you for extending the date for submissions. This has enabled me to comment.

I have reviewed your documentation in relation to the Future Water Project and I note the focus appears to be almost entirely on provision of a large body of water and supplementation of that bulk supply.
What I am looking for from Rous County Council and I haven't yet found it, is extensive, detailed assessment in relation to changing the ways water is supplied and used in our region. I am not qualified to comment on your statistics and projected population growth and total projected water consumption, but it seems to me that you are missing whole sections of planning in relation to proven modern techniques of water capture, conservation and reuse.
It is for this reason that I object to the installation of the proposed Dunoon dam within the Future Water Project 2060. I believe we are not acting responsibly in destroying an "Endangered Ecological Community (EEC)" (Nan Nicholson, The Nimbin Times September 2020) before we have assessed alternative action to achieve the same result.

I know that during the recent drought, water restrictions were put in place and there was a request in 2019 to reduce our daily consumption which produced some results. But you and I know that goodwill and pleasant asking and a request to consider community needs does not change the consumption behaviour of a population of busy humans.
I notice there is very little urban awareness around me of the need to conserve water and use it wisely. A real estate agent told a worker last week "just hose it" referring to a large outdoor area which needed to be swept. A young woman used the entire household hot water supply shaving her legs in her 30 minute shower. I have seen people turn on a shower and walk away from it for 5 minutes whilst they left it to run fast and freely waiting for hot water to arrive (of course I intervened and turned off the taps). The neighbours automatic watering system always runs water down the road gutters when the water hits an impervious layer. Fellow workers assured my daughter when she installed an urban rainwater tank in South West Sydney that it was a waste of her money because she would never make her money back because water was so cheap. This was limited superficial thinking. They all copied her and put in water tanks when severe water restrictions were introduced because of the ongoing drought. Annie Kia in The Nimbin Times, September 2020, reported that the water supplier in that region, Sydney Water, made remarkable achievements in water optimisation.

I am a consumer of water from Rocky Creek dam - I temporarily live in Byron Bay. I also have 60 years experience using an independent water supply in times of plentiful rain and severe drought in Victoria and near The Channon. I currently reuse much of my household water (carting clean used water to the garden, toilet flushing with grey water) in an effort to meet the request to reduce daily consumption of water. But most people do not have **ANY** awareness of the Rous County Council request or consciousness of why we might need to reconsider our water use. I would not expect that anyone else would move buckets of water around like I do - people don't do extra work for an idea.

I know that "hard wired" water technology does have an impact on consumption because consumers don't have to think about it. Immediate need (drought), cost and legal consequence (eg water restrictions) also have some effect. A good idea is to copy the Bangalow family which has installed a rainwater tank and pump which seamlessly delivers tank water to the house after it rains and Rocky Creek dam water when the tank is empty. Much of 2019 they provided their own household water supply. There is no inconvenience to the household and they don't have to think about it - their system is a good example of capturing and using our frequent showers of rain which can occur even during a green drought when Rocky Creek dam is low.
I request Rous County Council to consider, provide costings and propose other ways to provide enough water to residents in our region – both in new dwellings and retrofitting existing dwellings, in water optimisation and encouraging Government to loan the funds for smart water projects and allow staged repayments.

Grave concerns

1) One of the reasons I would like other options to be investigated is because I have grave concerns about severe, sudden and unpredictable rainfall which has been evident in The Channon/Dunoon catchment area and is predicted to occur more dramatically with earth's changing climate. If the proposed dam was full and the local catchment region experienced the rainfall which occurred in 2017 (17 inches overnight on already very wet earth) or worse as happened in the Lockyer Valley, how safe are residents downstream of the proposed dam? This high level of rainfall has occurred several times previously since my arrival in 1979 (eg one example - I think it was the mother's day flood in 1986 where residents in Casino Street were door knocked at midnight and had 30 minutes to evacuate before 1 metre of water washed in because of the rain which had fallen in The Channon/Dunoon catchment).
2) Is the proposed dam going to cut wildlife corridors used by koalas and other threatened species and affect platypus downstream? If so, I don't want us to keep on destroying habitat and contributing to the extinction of koalas and other wildlife without doing our utmost to avoid that destruction. Rous County Council proposal has not provided all the information that is needed to conclude a larger dam is totally necessary. I think we should go back to the drawing board and provide information on alternative smart water options.
3) We destroyed most of The Big Scrub possibly at a time when we did not know the true cost of that destruction. We know a lot more now. The Rous County Council proposes to knowingly destroy more of The Big Scrub "Lowland Rainforest EEC….(and) threatened flora species" (Nan Nicolson, The Nimbin Good Times September 2020. Is this wise? Must we destroy another habitat or could we carefully consider our needs and other options to meet those needs?
4) Similarly destruction of important indigenous cultural heritage needs to be weighed carefully. We have an opportunity to respectfully consider the needs of local indigenous people - it all hinges on taking a socially, environmentally and financially responsible position and considering modern alternatives to a dam.

In conclusion , it makes no sense to me the keep using the old thinking of "unlimited water" at any cost to the environment, especially when there are so many examples of other approaches to water supply and use which could allow this farmland, forest, indigenous cultural site and waterway to remain intact.

I respectfully request that the expenditure proposed for the dam be diverted to more sustainable, flexible and effective solutions of water supply and use. I do not support a fourfold increase in the cost of water. I support a moderate cost of a daily water allowance for persons and businesses with an increase in the cost of water overuse to drive greater water efficiency. Acceptance of the dam proposal without a serious evaluation of alternative water efficiency strategies is socially, environmentally and financially irresponsible.

Denise Nagorcka
[redacted]

[redacted]

From: blanche alexander [redacted]
Sent: Wednesday, 9 September 2020 7:54 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager,
Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date. The community appreciates it. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.

Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)

Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)

Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

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An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)

Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8)

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806(9)
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Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater

Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

Groundwater, where this is environmentally safe

The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Thank you for readingand for your consideration

Blanche Alexander

References and Notes

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[redacted]

From: Heather McDiarmid [redacted]
Sent: Wednesday, 9 September 2020 8:52 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Heather McDiarmid
[redacted]
Gender: Female

9th Sept. 2020
Rous County Council
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and GM,

Re: Proposed Dunoon Dam within the Future Water Project 2060

Thanks for the time extension for submissions. (Needed to do some research!)

I DO NOT support the proposed Channon/Dunoon Dam

I believe there are other methods of water efficiency required for the long-term use of the people who live here. I do NOT believe another dam is the answer.

All over the world we have come to acknowledge, dams in torrential rain areas are time bombs. This IS a torrential rain area. We need to individually harvest the rain-water (tanks); reduce runoff, increase personal efficiency.

We need to find ways to support our delicate flora and fauna while surviving on the driest continent on earth. We simply can-not afford to keep destroying our ecosystems. The Channon Gorge has a unique lowland rainforest ecosystem; lets decide to protect it, not ruin it, FOREVER).

I have only lived in this area for 26years. There are other people who have lived here a lot longer; generations who have family history and connections with the 'proposed Dam site'. Again, we need to support our cultural heritage, not destroy it, FOREVER.

I ask you to show common-sense, compassion and comprehension of the problems associated with this Damn proposal. **No Dam.**

Thankyou,

Heather McDiarmid

[redacted]

From: Ellie Misdale [redacted]
Sent: Wednesday, 9 September 2020 8:56 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Ellie Misdale
[redacted]

9th September 2020
Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thank you for supporting the extension of the submission date. I would like to also acknowledge the complexity
of what Rous does to provide water to our region.

I am the owner of a 60 acre property located at the end of [redacted]
Each day, I merge from [redacted], and look over to the proposed Dunoon Dam site.
This deeply concerns me as a land owner, rate and water paying resident and community member of the Lismore LGA.
This Dam would drastically change the face and identity of the Dunoon & The Channon villages.
I find the proposed project has not sufficiently taken into account the needs and concerns of the local community.

I implore you to take the opposition of this Dam seriously and do not commence on this project.
I outline the reasons against and suggested alternatives below.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency** - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) *(1)*
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites (Cultural Heritage Impact Assessment, 2011)*(2)*. Ongoing disregard for First Nations' heritage.

- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest** (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)*(3)*.

  Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

  Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)

  Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.

- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 **does not justify** such a large and destructive dam. The dam risks being **an expensive white dinosaur**, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections'*, Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)
- **Catastrophic flooding downstream in worst floods,** particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)
- **Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.**

I SUPPORT these alternatives:

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- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. (We understand Rous has *not* costed this in creating their future water plan)
  Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.*(7) (8)*
  Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.*(9)* (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
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  Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history *(10)*

- **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.*(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.*

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  Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.*(12)* https://www.yourhome.gov.au/water/rainwater

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- **Groundwater, where this is environmentally safe**
  The Australian government provides a lot of information on the ecological impacts and groundwater usage.*(13)* https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Sincerely,

Ellie Misdale.

References and Notes

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9. Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
10. Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?,* Water Research Australia Limited, Adelaide.

11. Windhoek Goreangab Operating Company (Pty) Ltd 2020,*Our history | Wingoc,* Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>

12. $220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).

13. Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home*, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>

14. Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

[redacted]

From: jesse kelly [redacted]
Sent: Wednesday, 9 September 2020 9:12 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Jesse Kelly
[redacted]

9th September 2020
Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thank you for supporting the extension of the submission date. I would like to also acknowledge the complexity
of what Rous does to provide water to our region.

I am the owner of a 60 acre property located at the [redacted].
Each day, I merge from [redacted], and look over to the proposed Dunoon Dam site.
This deeply concerns me as a land owner, rate and water paying resident and community member of the Lismore LGA.
This Dam would drastically change the face and identity of the Dunoon & The Channon villages.
I find the proposed project has not sufficiently taken into account the needs and concerns of the local community.

I implore you to take the opposition of this Dam seriously and do not commence on this project.
I outline the reasons against and suggested alternatives below.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency** - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) *(1)*
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and often wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites (Cultural Heritage Impact Assessment, 2011)*(2)*. Ongoing disregard for First Nations' heritage.
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest** (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)*(3)*.

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)

Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.

- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 **does not justify** such a large and destructive dam. The dam risks being **an expensive white dinosaur**, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, *'NSW population projections'*, Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)
- **Catastrophic flooding downstream in worst floods,** particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)
- **Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.**

<u>I SUPPORT these alternatives:</u>

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. (We understand Rous has *not* costed this in creating their future water plan)
  Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.*(7) (8)*
  Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.*(9)* (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
- **Water re-use in various ways,** including Purified Recycled Potable water.
  A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806*(9)*
  Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history *(10)*
- **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.*(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.*

The Australian government advises that: “Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs.”

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.*(12)* https://www.yourhome.gov.au/water/rainwater

- **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- **Groundwater, where this is environmentally safe**
The Australian government provides a lot of information on the ecological impacts and groundwater usage.*(13)* https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Sincerely,

Jesse Kelly.

References and Notes

1. Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
2. Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
3. SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
4. NSW Department of Planning, Industry and Environment 2019, ‘Delivering the plan’, Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
5. NSW Department of Planning, Industry and Environment 2019, *‘NSW population projections ’*, Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to “Local Government Factsheets”.
6. Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
7. The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options*, Rous County Council, Lismore.
8. Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water*, Institute for Sustainable Futures, Sydney.
9. Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
10. Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?,* Water Research Australia Limited, Adelaide.
11. Windhoek Goreangab Operating Company (Pty) Ltd 2020,*Our history | Wingoc,* Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
12. $220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water

needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).

13. Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home*, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>

14. Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

[redacted]

From: Leah Seed [redacted]
Sent: Wednesday, 9 September 2020 9:58 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Leah Seed
[redacted]

9th September 2020
Rous County Council, Lismore NSW 2480 <council@rous.nsw.gov.au>
Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

I grew up in The Channon, and the environment and community of the area are still a significant part of my life. I care deeply about loss of habitat and also the impact that this will have on the wellbeing of the community. I also feel that the decisions made have a much broader impact on society into the future and once made, cannot be undone.

Thankyou for supporting the extension of the submission date. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:
- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW (1)
- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural (2) Heritage Impact Assessment, 2011) . Ongoing disregard for First Nations' heritage.
- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) .

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning,

Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan>, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.

Rous is required to avoid this destruction because there are economically viable and more effective solutions.

- Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.(5)
- The small population increase predicted for the four Rous-supplied councils of 12,720 between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".
- Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)
- Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.
The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

- An investment in system-wide water efficiency and strong demand management.

Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within existing supply.
Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible. (Stuart White, 2020
Prof Stuart White - Rous Water RSWP slides 20200904.pdf

Prof Stuart White - Rous Water RSWP slides 20200904.pdf

● Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?
the existing supply.

https://www.waterra.com.au/publications/document-search/?download=1806
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled (10)

● Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments. This builds community resilience - much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks. Rainwater | YourHome

Rainwater | YourHome

Rainwater is a valuable natural resource that has been collected by Australian households for domestic use since colonial times.

● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
● Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown (11)

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc
NSW Govt 2006 MWP summary.pdf

(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan
> , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections>
Scroll down to "Local Government Factsheets".
(6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
(7) The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy : preferred options, Rous County Council, Lismore.
(8) Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water, Institute for Sustainable Futures, Sydney.
(9) Stuart White, 2020 http://www.bit.ly/Prof-Stuart-White-Rous-slides)
(10)Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide. (11)WindhoekGoreangabOperatingCompany(Pty)Ltd2020 ,Ourhistory|Wingoc,V eoliaEnvironment,
Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, < https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Sent from Yahoo Mail for iPhone

[redacted]

From: Barb Jestico [redacted]
Sent: Wednesday, 9 September 2020 10:35 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Barbara Jestico
[redacted]
Female

9th September 2020
Rous County Council,
Lismore NSW 2480
<council@rous.nsw.gov.au>
Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

Re : The proposed Dunoon Dam within the Future Water Project 2060

As part of [redacted] Community I, like others, thank you for the extension date for our submissions. I also acknowledge the complexity & service that Rous water does provide for our region.

I DO NOT support the proposed Channon-Dunoon Dam for the following reasons:

1. **Flooding Rocky Creek area would be a complete catastrophe to the wildlife, flora and ecosystem and you know it.**
2. **The original plans for this dam came about in the 1970s, there are far more modern ways of providing water to the area and you know it.**
3. **Fix the leaks – thousands of tons of water is saved when you fix the leaks so a dam will not be needed.**
4. **And last but definitely not least The Channon and wider community are an educated and informed group who urge you seek a better way of providing water for this area without a new dam.**

Barb Jestico

I live in [redacted] and love it here.

[redacted]

From: Luis Feliu [redacted]
Sent: Wednesday, 9 September 2020 11:45 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

To: Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I'm gobsmacked that in 2020, looking ahead to 2060, the dam option is your preferred option for securing water well into the future.

I ABSOLUTELY OBJECT to such a backward proposal, when demand management has not been seriously looked at (a cheaper water-wise education campaign for those on reticulated water), leakage from the regional water system is way too high (around a quarter!), rainwater tanks not mandated or subsidised, even recycling grey water (purple pipes) is not regarded essential by some of your member councils for greenfield development sites.

This is a last-century solution when new ways of recycling, using and harvesting water are here and now, they're just ignored.

I moved to the area almost five years ago and live near Whian Whian Falls, a place of rare beauty which many people regard as a jewel of the area, including its lower reaches with their swimming holes, platypus, birds, rare rainforest, all of which will be severely impacted if a dam is built lower downstream.

I take may grandchildren down there when they visit us here and they were shellshocked when I recently told them a dam to flush more good drinking water down the toilet is planned to be built nearby.

Please stop this insanity!

If flooded, the beauty of the area, its Aboriginal heritage and ecological values will be lost forever.

I urge councillors and staff at Rous to take the time to walk and look at this world-class rainforest area and waterfalls which is part of that creek system, it's simply magnificent.

The recent Rio Tinto controversy where an ancient Aboriginal heritage site was wilfully destroyed has sparked outrage all over the world. I see this plan to dam as equivalent cultural destruction. The dam option has no sound planning nor a basis on whole-of-catchment savings which would negate this nonsense of putting it at the top of a water-security wish list.

I strongly believe we need to take action on a range of available water-wise options and proven alternatives. The tide is turning on renewable and sustainable power and it's well past time to act with this in mind.

By now you would have read or been told in the many other submissions the very important reasons why this option should be discarded, including:

1. Not modelling system-wide water efficiency, which has been proven that by doing so, Sydney added an additional 950,000 people without a rise in consumption, according to the NSW Government.

2. A dam would encourage continued inefficient and wasteful water management by local governments.

3. It's old-hat thinking and not fit for the purpose or future, a single-use dam plan would swallow all resources in one big expensive 'white dinosaur' project.

4. Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)

5. Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species.

6. There are economically viable and more effective solutions to secure water for the future growth of the region, so Rous can and should avoid this destruction.

7. Noise and visual impacts will be ongoing.

8. It's an un-economic plan with expected higher prices for consumers due to a quadrupling in the cost of water (according to the Rous general manager).

9. The small population increase predicted for the four Rous-supplied councils over the next 40 years does not justify such a large and destructive dam.

10. Water re-use in various ways, including Purified Recycled Potable water. Third-world countries are doing it so why can't we?

11. Water harvesting (urban runoff, rain tanks) with water tanks on all new (and existing) developments promoted or mandated.

Luis Feliu

[redacted]

[redacted]

From: David Rowell [redacted]
Sent: Wednesday, 9 September 2020 11:58 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

David Rowell and Elizabeth McLeod
[redacted]

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I won't beat around the bush. The proposal to build ANOTHER dam on Rocky creek is appalling!.

Widjabul-Wiyabal impacts

"In terms of the indigenous heritage impacts (there are scar trees and graves in the area to be impacted, with 18 sites identified so far) Cr Williams said, 'the point is to talk to the local people who are concerned, **not just everybody around who's got an opinion,** but the people for whom this is actually a special place, who may have some relationship to the things that are there." https://www.echo.net.au/2020/07/rous-water-chair-puts-case-for-the-dunoon-dam/

Keith, this is such a transparent attempt to divide and conquer and what's more I found that expression "not just everybody around who's got an opinion" pretty offensive. On the one hand Rous invites the public to make a submission on the proposed Dunoon dam, then on the other hand you try to publicly disenfranchise the opinions of the public before they have even had a chance to make submission. So what, as an non-indigenous Australians, do you want us to just look the other way while Rous Council "Rio Tinto's" the culture of the indigenous population of the Lismore LGA. That is not going to happen. It is not the 1950's anymore Keith!

Destruction of remnant Big Scrub

I am sorry but adding another dam to Rocky creek to provide water for McMansions with 11 flush toilets at Broken Head is just WRONG. The Big Scrub is an ancient public asset that was decimated. Over the last 30 years it has been brought back from the edge of extinction. Why anyone would think another dam on Rocky Creek is a good idea is beyond me.

Regards

David Rowell.

[redacted]

From: andi neilands [redacted]
Sent: Wednesday, 9 September 2020 5:22 PM
To: Records
Subject: The proposed Dunoon/The Channon Dam

9/9/2020
Andi Neilands
[redacted]

In reference to: The proposed Dunoon/The Channon Dam

To whom it may concern,

I would like to express my concerns about the construction and effects of the proposed Dam for me, my community, and beyond.

As the landholder probably most affected by the construction of the dam wall. I am both stressed and uncertain about what the future might hold. My house is about 400 metres from and above the centre of the dam wall site. Because of the noise of blasting and machinery, I expect that it will be pretty much unliveable here during the construction phase. Should I want to sell my property, I fear my property value might be negatively affected by this as well. I have already communicated with you about selling but have been told I may have to wait till 2023 for consideration. You will understand, I hope, how this uncertainty for me will be difficult.

I have lived here for 40 years and deeply love and care for this little piece of wild beauty for which I feel a custodial responsibility. I raised my family to respect, and feel privileged to interact very closely with, this pretty much undisturbed natural environment in the Rocky Creek gorge, the inundation area and the forest of the buffer zone. My kids used to go exploring in the bush, fishing and swimming in the gorge and learn look for crystals ("clearies" they used to call them) in the Creek.

I hope that if the decision is to go ahead with the dam investigations, that will be a new and much better flora and fauna listing created. The last one in 2012, was both an unreliable "desktop" study and a survey done by some very inexperienced, city dwelling, young, recent graduates. Their names were not the ones on the report. I had tell them of at least 80 commonly seen (by my family) different fauna which they hadn't listed. These included Koalas, Black Cockatoos and Wedge Tail Eagles, Platypus, Goannas and others. I also worry about the survival of animals during any attempted translocation from the construction and flood zones.

I am pleased that this dam would have environmental flows included but I also worry about the potentially devastating effects of major flooding events on downstream communities. These may become more frequent with climate change.

Thank you for taking the time to read my concerns.
Andi Neilands

[redacted]

From: Terence Balle [redacted]
Sent: Wednesday, 9 September 2020 5:13 PM
To: Records
Subject: The proposed Dunoon Dam within the Future Water Project 2060

[redacted]

9th September 2020
Rous County Council,
Lismore NSW 2480

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date. The community appreciates it. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011)(2). Ongoing disregard for First Nations' heritage.

Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011)(3).

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.

Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

The small population increase predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)

Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6)

Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives.

The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)

Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.(7) (8)

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.(9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)

Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806(9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history(10)

Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.(11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.(12) https://www.yourhome.gov.au/water/rainwater

Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.(13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes
Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
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Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water, Institute for Sustainable Futures, Sydney.
Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide.
Windhoek Goreangab Operating Company (Pty) Ltd 2020,Our history | Wingoc, Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Kind regards,

Terence Balle

[redacted]

From: Russell Davie [redacted]
Sent: Wednesday, 9 September 2020 5:54 PM
To: Records
Cc: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I live in [redacted] and have much appreciation for the features and benefits of the old growth rainforest that remains in the catchment.
To lose this rainforest would be a massive downgrading of the amenity of living in the Northern Rivers and in the Richmond River Catchment.

Thankyou for supporting the extension of the submission date. We also acknowledge the complexity of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:
- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)
- The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.
- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.
- Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011) (2) . Ongoing disregard for First Nations' heritage.
- Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) (3) .

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
Council s are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)
Rous is required to avoid this destruction because there are economically viable and more effective solutions.
- Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- Higher prices for consumers due to a 4x increase in the cost of water. Rous general

manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

● The small population increase predicted for the four Rous-supplied councils of 12,720 (5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur , diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > scroll down to "Local Government Factsheets". (5)

● Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011) (6)

● Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives: I believe we need to take action on a suite of smart water options and proven alternatives.

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Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)

Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply. (7) (8)

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● Water re-use in various ways, including Purified Recycled Potable water.

A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?https://www.waterra.com.au/publications/document-search/?download=1806 (9)

Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history (10)

●Water harvesting (urban runoff; rain tanks):

Water tanks on all new (and existing) developments. (11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.

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● Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

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The Australian government provides a lot of information on the ecological impacts and groundwater usage. (13) https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > Scroll down to "Local Government Factsheets".
(6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
(7) The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy : preferred options , Rous County Council, Lismore.
(8) Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water , Institute for Sustainable Futures, Sydney.
(9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
(10)Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide.
(11)Windhoek Goreangab Operating Company (Pty) Ltd 2020 ,Our history | Wingoc, V eolia Environment, Windhoek, viewed 3 August 2020, < https://www.wingoc.com.na/ >
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home , Canberra, viewed 3 August 2020, < https://www.yourhome.gov.au/water/rainwater >
(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, < https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown >

kind regards

Russell

Russell Davie
[redacted]

Dr Megan Kearney

[redacted]

8th September 2020

Rous County Council

Lismore NSW 2480

council@rous.nsw.gov.au

Dear General Manager and Councillors

Re: The proposed Dunoon Dam within the Future Water Project 2060

I have lived and practised as a veterinarian in [redacted] since 2006. I grew up in Mudgeeraba on the Gold Coast and was a regular visitor to the Northern Rivers since I was a veterinary student in the 1980's. My dream was to live and practice in the Northern Rivers because of it's unique biodiversity and cultural diversity. I am working on the frontline of the rehabilitation and release of injured, diseased and orphaned wildlife. A study I did as part of my Masters of Veterinary Studies in Conservation Medicine found that in 2017-2018 approximately 10 000 native fauna were rescued by local wildlife rescue groups based in the Northern Rivers, such as WIRES Northern Rivers, Northern Rivers Wildlife Carers and Friends of the Koala. The majority of rescued animals were from Lismore City and Byron Shire LGA's. Local wildlife populations are still in recovery from the serious impacts of recent drought and bushfires in our region.

I object to the proposed The Channon-Dunoon dam for the following reasons:

- Loss of biodiversity through the destruction of The Channon Gorge and its endangered ecological community of lowland rainforest and threatened flora and fauna species.

- Destruction of important Indigenous cultural heritage, including burial sites and other culturally important sites.

- Risk of catastrophic flooding downstream in severe flood events.
- Lost opportunity to invest in system-wide water efficiency including smart water solutions
- A dam such this proposed dam may be used to drive unsustainable population growth, as the government attempts to gain a return from an unnecessary and stranded investment.

I support using the current water issues as an opportunity to invest in 21st century smart water solutions

- Investment in system-wide water efficiency and water demand management
- Integrating regenerative agricultural practices and slowing the flow of water across the landscape
- Water harvesting – rainwater tanks, regenerative agriculture
- Re-use of water including purified potable recycled water
- Improved drought and contingency planning
- Improving the efficiency of Rocky Creek dam

I encourage Rous County Council to re-consider smarter and more efficient ways of investing in water security that will be supported by the people of the Rous County Council region.

Kind regards

Dr Megan Kearney BVSc MVS(ConsMed) VetMFHom DipHerbMed MNHAA

[redacted]

Country Labor

Janelle Saffin MP
MEMBER FOR LISMORE

September 9, 2020
REF: HG

Dear Rous County Councillors and General Manager,

Thank you for consulting with the local community on your Future Water Strategy 2060, specifically the Dunoon Dam component of the strategy. Water security into the future for our communities, farms and the environment is of vital importance. Many locals from across the Lismore Electorate have raised the issue with me, so having a water plan for the future is crucial.

That being said I am yet to be convinced that the 50GL Dunoon Dam is the best solution to efficiently and effectively ensure water security into the future. Numerous constituents have raised with me concerns that this dam is potentially a missed opportunity to invest in sustainable water management, about the potential flooding of endangered rainforest and climate change implications. I share these concerns.

I understand that Rous County Council (RCC) is the supplier of water to the whole region and we need water supply to match population increases in each council area. In securing long term and fairly distributed water supply, the Dunoon Dam is not a clear frontrunner. Other options are available to RCC and must be considered.

Dr Stuart White, of the University of Technology Sydney Institute for Sustainable Futures has detailed alternative proposals that I believe have merit and are worthy of consideration. Dr White addresses key issues such as diverse supplies of water, how much people and businesses pay for water, climate change implications, the cost effectiveness of water security programs and investment in system wide efficiency.

[redacted]

Country Labor for country communities

He states that "case has not been made" to build a new dam. Dr White is highly regarded for his work and identifies that there is scope for major improvements in water efficiency in the region.

I would like to see more work done on this and detailed costing of all the options. Water security is in all of our interests. It is vital to the future of our economy, environment and communities. Such a large investment in something so important requires due diligence and all options need to be considered. I would ask that these can be done before a definitive timeframe is put around the consultation with the community.

I look forward to working together to ensure water security for our region into the future.

Kind Regards,

[redacted]

Janelle Saffin MP

Member for Lismore

[redacted]

Deborah Lilly

[redacted]

9 September 2020

Dear Sirs

DUNOON DAM PROPOSAL – FUTURE WATER PROJECT 2060

Regarding the proposal to build a dam at Dunoon, I object because of the ecological impacts and threats to First Nations heritage. The Aboriginal input, as per their cultural assessment, should be acted upon and not ignored. The area concerned is a living heritage which is of immeasurable value not only to the First Nations people, but all of us who care about the precious little remaining ***Big Scrub Rainforest***, of which there is only one percent remaining. This is an irreplaceable cosystem vital for the ongoing viability of the depleted ecosystem that most of us live in; it is a seedbank and time capsule from Gondwanaland that may contain things not yet recognised.

Furthermore, water can be reused. In the Northern Rivers region 160 litres per person per day are used yet only 2.5 litres of water are ingested. We need to have a rethink about water being flushed down toilets, used on the garden or for cleaning roofs; the Purple Pipe System of reuse will of course have to become a reality sooner or later. Why not sooner, and protect our precious remaining ecosystem at the Big Scrub? ***You cannot offset the web of life, you can only protect it*** (Vandana Shiva).

Yours truly

Deborah Lilly

DEAR COUNCIL,

I HOPE THIS DAM DOESN'T HAPPEN. HERE ARE THREE REASONS WHY.

PLATYPUSES

THE PLATYPUSES MIGHT DROWN AND THAT'S BAD. THE DAM WILL FLOOD THEIR BURROWS AND THEY WILL GO DOWN IN NUMBERS AND THAT'S VERY BAD.

KOALAS

KOALAS ARE CUTE. I DON'T WANT KOALAS TO BE IN THE NEXT ENDANGERED ANIMALS BOOK. THEIR TREES WILL BE UNDER WATER IF YOU BUILD THIS DAM.

MY GRANDPARENTS' FARM

I LOVE NAN AND HUGH AND MY FAVORITE COW. THEY COULD ALL DIE IF YOU BUILD THIS DAM.

PLEASE DON'T BUILD THIS DAM.

LOVE FROM DANIEL

(This is a submission to the Future Water Project 2060 by Daniel Nicholson, aged 7. The dam to which he is referring is the proposed Dunoon dam. Nan and Hugh are his grandparents who live in Zone 3, an area downstream of the dam which, if the dam went ahead, is anticipated to experience substantial increased flooding during large rain events. The increase in flooding could see dangerous and potentially fatal flooding in Zone 3. Date 9 September 2020.)

[redacted]

9 September, 2020

Dear sir/Madam

I put fingers to keyboard because I believe it important to add my voice to others regarding concerns about the Dunoon dam proposal.

1,. Dam building has been around for centuries precisely because it has worked. But I question the appropriateness of large dam building at this time. Pandemics, global warming, chaotic weather patterns, bushfires are all currently impacting on our society and our natural habitats. So … the world is in significant flux. Why continue to use old technology (even though proven) for new world problems. Building a large dam comes across as a quick and easy fix, denies the co-dependence of humans with our physical world and implies limits of Rous Water to be able to consider much else. I argue that Australians now have access to information and the technology to be informed about many worked examples of alternatives to large dams for equable water accessibility. A redirection of dam resources to explore other options seems sensible.

2. We live in an environment rich in natural resources, a rare commodity. How fortunate we are and can enjoy the financial contribution the many tourists bring as a consequence. Yet decision makers place a higher priority on what appears as a sledge hammer approach to impact this rare asset in lieu of the provision of community water.

3. Individual stewardship of resources. I live on a farm and am very aware of the challenges in maintaining a water supply. Building a large dam removes the press on individuals to consider the relationship between behavior, environment and water access. Recognising the need for more water in the future is a community wide challenge, and everyone should be encouraged to take more responsibility for water. I recognize changing people's behavior is a very time consuming process requiring collaboration and would take a lot longer than building a dam. But surely the population projections allow time for this and other alternatives to be considered.

Yours faithfully

Julia Stewart

FUTURE WATER PROJECT 2060

Rous County Council

Comment from

Evans Head Residents for Sustainable Development Inc.

1. We have examined the six "*key documents*"[1] regarding the *Future Water Project* and generally commend the County Council and its consultants for the comprehensiveness of their reports including consideration of various scenarios.
2. Notwithstanding this body of work there are still major problems which have not been addressed in these reports, and concerns raised by their findings.
3. Rous County Council (RCC) is clearly hooked on a growth strategy being promulgated by the State governments in their various regional plans. These State plans are long on rhetoric and 'talking up or advocating for growth' and very short on detailed analysis and empirical support. They NEVER consider the fact that we live in a finite world with finite resources. No attention is giving to 'limits to growth' which include the capacity of the land (read environment) to carry, sustainably, an increasing population. The question is just how many people can you put on the paddock before the environment is damaged or can no longer cope?
4. The Northern Rivers Regional Strategy Secretariat produced a *Discussion Paper: A Region of Villages* (Feb, 2001) which showed that the Northern Rivers was already past its 'carrying capacity' almost 20 years ago. Since that time there has been considerable growth although not quite the growth anticipated in the State government Regional Strategy Papers. While the *Region of Villages* paper was initially widely embraced by Councils who supported the project when it was claimed that the region was little over 10% of our carrying capacity, the project was abandoned in a wholesale fashion when a simple error in calculation showed that we were well over that capacity. In other words the councils were happy to embrace the report and its assumptions as long as it fitted with their appetite for growth. Basically councils demonstrated that they were not interested in what happened to the environment when we were past carrying capacity and were driven in their decisions about the future by economic considerations alone. Things have not changed since that time and growth and economic considerations alone are the basis for the assumption that we must build a new dam while the environment is left to hang out to dry. Sustainability does not really figure in any discussion at all about our future.
5. The CWT Feasibility Report on Water Reuse, one of the six "key reports", demonstrates unequivocally that the environment counts for nothing. Examination of the data provided by the various Councils (served by Rous) for their Sewerage Treatment Plants shows that many of them are producing effluent which while sometimes meeting certain out-of-date criteria for environmental discharge acceptibility set by government, are, none-the-less continuing to pollute the environment with impaired water quality (see Tables 5-4 through 5-9). Of course it is argued elsewhere that it is too costly to clean up

[1] https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-KZG-22-16-87

the water to potable or even an acceptable standard for the environment demonstrating that the economic consideration trumps all other variables and the *Principles of Ecologically Sustainable Development*[2] are being ignored.

6. The failure to consider the environmental cost under the Principles of Ecologically Sustainable Development enshrined in various pieces of State legislation including the The Council's Charter (s.8) under the NSW *Local Government Act:*

   s.8(A)2 (c) *to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible*

   s.8(A)2 (d) *Councils should consider the principles of ecologically sustainable development*

   is a clear breach of the principles which should be governing decision-making with regard to management of the water cycle including future water supply.

7. One of the Principle of ESD is that of inter-generational equity. That principle requires *the present generation to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.* We see no evidence of this matter being addressed in the reports.
8. Another of the Principles requires the *Internalisation of external environmental costs, that is the polluter pays principle should be adopted. Those who generate pollution and waste should bear the costs of containment*. Moreover, *the users of goods and services should pay prices based on the full life cycle of the costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste*[3].
9. We see no evidence that ESD Principles are being observed with regard to sewerage treatment and make the point that until there is a clean up of waste water to acceptable environmental and health standards where it could be used as part of the water supply there should be a moratorium on further growth on the Northern River.
10. What's happening here is that different aspects of the full water cycle are being treated in separate silos whereas they should be fully integrated into systems thinking about water management for the North Coast. It is basically being argued *sotto voce* that sewerage water is too costly to clean up for both potable and non-potable uses and so we will switch to other alternates which are cheaper, such as a new dam, while still continuing to pollute the environment with poor quality water from our STPs for which Rous is not responsible. It is just not ethical to kick the can down the road for the costs of fixing this problem to future generations. We have an obligation to make sure that we do not leave them a legacy of pollution as part of water cycle management.
11. The CWT Report also leaves us with concern about the basis for some decisions which have been made with regard to water reuse from STPs [WWTPs]. For example Section 2.3 on Richmond Valley Council states: "*it has been determined that the use of these two WWTPs* [Coraki and Casino] *as sources of recycled water is unlikely to be feasible*" but no empirical evidence is provided to support this decision. The reasons given are feeble and don't even pass 'the pub test'. 'Volume of discharge' and 'distance from a raw water

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2 http://www.lec.justice.nsw.gov.au/Documents/preston_principles%20of%20ecologically%20sustainable%20development.pdf

3 See footnote 2 for reference to material quoted here.

source' are not arguments against use for recycling particularly when you see that the Broadwater Sugar Mill refuses to use recycled water that could have come from the Evans Head STP for water cooling of the Mill instead of drinking water, and Council abandoned plans for recycling of water for a number of feasible locations for reasons which still are not clear except perhaps for cost. In the meantime the Evans Head STP continues to discharge effluent which is not potable and which comes from Evans Head, Broadwater and Woodburn into a waterway running into Salty Lagoon in Broadwater National Park. The lake is not suitable for swimming, etc. All of this begs questions about local government being guided by ESD Principles in its water cycle management. And it also begs questions about the independence of the decision-making. Who decided that recycling wasn't feasible and on what grounds? It would seem that economic decision alone was the basis for the choice.

12. Residential development is set to increase by 37% by 2060 and non-residential by 83% according to information provided in one of the six key reports producing a shortfall for future water supply in a region that is already past its carrying capacity in 2020. Building a dam is not the solution and irrational adherence to a growth model predicated on unsustainability is not the answer to the problem.

Concluding Remarks

We are opposed to the development of any dam for northern NSW because:

a. the decision is based on a growth model which has not been demonstrated to be sustainable.
b. the decision-making fails to take account of the information available to RCC for the past two decades that the Northern Rivers Region is already past its 'carrying capacity' for development yet choses to ignore this critical information which was widely embraced at the time.
c. The decision-making fails to take account of the Principles of Ecologically Sustainable Development, most particularly the Principle of Intergenerational Equity and the Principle of Polluter Pays. Economics prevail in the decision-making and the environmental cost is not considered at all.
d. The decision-making seems to be partly based on assessments made by individual councils with no checks on the independence or validity of the advice offered.
e. No convincing evidence-based case is made for dam development. The logic of the current case is that we need a dam because there will be more development.

There must be a moratorium on development and therefore a new dam.

Dr Richard Gates

For

Evans Head Residents for Sustainable Development Inc.

Lorraine Vass

'Bandelier'
[redacted]

Future Water Project Feedback
PO Box 230
LISMORE NSW 2480

email: council@rous.nsw.gov.au

Dear Sir/Madam

I have followed the development of Rous Water's Future Water Strategy since at least mid-2008, attending a couple of community forums in Dunoon and Lismore in August and September of that year.

I do not support the preferred options to secure the region's future water, inclusive of the Dunoon Dam proposal.

My main reason for opposing them and especially the Dunoon Dam is because of the resulting inundation of some of the most significant regional wildlife corridors and threatened species habitats south of the Nightcap Range; in particular those of the Koala

The area of the proposed Dunoon Dam is an acknowledged koala hotspot and lies within the Far north-east Hinterland Area of Regional Koala Significance (ARKS)[1]. The *Dunoon Terrestrial Ecology Impact Assessment* (SMEC Australia, 2011) found that the proposed works for the study area of the proposed Dunoon Dam would result in a *Significant impact likely* assessment for 23 recorded threatened entities including the Koala (pp.135-136). Specifically:

> "The dam would remove important habitat features and local linkages for threatened fauna species. In particular, movement pathways for the threatened Koala will be impeded from the installation of the dam wall, spillway, and the inundation area". (p.i)

The Terrestrial Assessment goes on to say:

> "While these impacts will be mitigated utilising the measures outlined in this report should the dam proceed, there are likely to be residual impacts that cannot be mitigated". (p.136)

Keeping in mind the dire findings of the NSW Legislative Council's Report on *Koala populations and habitat in New South Wales* (June 2020) and the even more recent study of the impact of the 2019 spring-summer bushfires on koalas in three fire-grounds in our region (Wardell 70% decline, Busby's Flat at Royal Camp State Forest 72% decline and Busby's Flat at Braemar State Forest 47% decline)[2] it is clear that every koala is precious if our Northern Rivers koalas are to survive in the wild.

My other reasons for opposition are destruction of important Indigenous cultural heritage; destruction of The Channon Gorge and its endangered ecological community of lowland rainforest; ignoring the proven alternative approach to sustainable water supply known as system-wide water efficiency and

[1] ARKS are defined as regional scale areas of currently known, moderate to high density of koala occupancy.

[2] ABC Mid North Coast, 7 September 2020: *WWF report finds 71pc decline in koala numbers across northern NSW bushfire affected areas* by Kirstie Wellauer & Kerrin Thomas.

the anticipated fourfold increase in the cost of supplying water if the dam proceeds.

Thank you for the opportunity to make these brief comments.

Yours sincerely

Lorraine Vass
9 September 2020

To: council@rous.nsw.gov.au

cc: Rous Councillors

RE: proposed Dunoon dam within the Future Water Project 2060

9th September 2020

Dear Rous Councillors and General Manager

RE: proposed Dunoon dam within the Future Water Project 2060

I have been a resident of the NSW North Coast since 1988. I care about what happens to our natural and cultural heritage and I care about the sustainability of proposed actions by those in positions of governance.

I do not support the proposed Dunoon Dam because it is not a sustainable project and will undoubtedly cause harm to Aboriginal Cultural Heritage as well as to the health of our environment.

I believe that this project will have unacceptable impacts on precious ecosystems such as warm temperate rainforest on sandstone and other rainforest vegetation communities. Plans to offset impacts on rare plant communities are not an acceptable way to mitigate impacts of this project.

The destruction of important habitats for native flora and fauna should be avoided. It is not necessary to degrade and destroy habitats and regenerating other lands is not an equitable or fair offset.

Instead of proceeding with the construction of this proposed dam, Rous should focus on improving water efficiency and demand management and potable water re-use.

Sincerely,

Holly North
[redacted]

Feedback Submission Re: Proposed Dunoon Dam within the Future Water Project 2060

To: General Manager, Rous County Council
PO Box 230, Lismore NSW 2480

From: MICHAEL PAWSON

Address: [redacted]

Firstly, the community appreciates the submission extension. We also acknowledge the complexity of the work Rous does to provide water for our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency.** This is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption.[1]
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century by swallowing all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites.[2]
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest,** threatened flora and fauna species.[3] Rous's plan to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone is problematic as the type of vegetation offered as recompense is not equivalent.(Nan Nicholson, botanist) Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."[4] Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.
- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous-supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks diverting expenditure away from more sustainable, flexible and effective solutions.[5]

I SUPPORT these alternatives:

We need a suite of smart water options and proven alternatives, not a huge new dam. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. *(We understand Rous has not costed this in creating their future water plan)* Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.[6][7]

North Coast Environment Council Inc.
Honorary Secretary
Jimmy Malecki
[redacted]

Re: The proposed Dunoon Dam within the Future Water Project 2060

9th September 2020
Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au
Dear Rous Councillors and General Manager

The North Coast Environment Council (NCEC) is the peak regional conservation group on the NSW North Coast which has been active in protecting the environment for more than forty years. Our organisation receives no government funding, relying on the' in kind' contribution of dedicated volunteers to highlight issues of environmental concern and campaign for an end to environmental destruction.

A number of our members reside in the area of the proposed Dunoon Dam and have raised serious issues about this proposal. The NCEC fully supports these concerns.

We believe that the excessive resources spent in construction of the proposed dam will see a lost opportunity to invest in system-wide water efficiency which is the cheapest & fastest way to ensure supply-demand balance. The dam would encourage continued inefficient and often wasteful water management by local governments and consumers. They would have no incentive to do things differently.

We understand that the proposed dam will result in higher prices for consumers due to a fourfold increase in the cost of water. The will impact unfairly on people with low incomes, the unemployed and pensioners.

A particular concern of the NCEC is the destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including the regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) *(3)* . We do not believe that this rare warm temperate community can be adequately offset through the proposal to regenerate degraded land in the buffer zone.

We understand there may be significant indigenous heritage values at risk of loss including burial sites. We believe the lack of respect for significant aboriginal heritage values is not in keeping with the support for reconciliation held by the local community.

We are also concerned about the downstream hydrological changes to stream flow of the proposed dam particularly increased risk of flooding during extreme rainfall events, including increased erosion and disturbance to riparian communities.

The unacceptable impact on the local community of the construction phase which will include excessive noise, truck movements on local roads and a visual eyesore in what is currently an aesthetically pleasing landscape.

We believe that the small population increase predicted for the four Rous-supplied councils of 12,720 (5)between 2020-2060 does not justify such a large and destructive dam. The excessive expense of the dam may result in diverting expenditure away from more sustainable, flexible and effective solutions.

The NCEC believes, rather than beginning to construct the proposed dam that Rous County Council need to take action on a suite of smart water options and proven alternatives. These include ;

*An investment in system-wide water efficiency and strong demand management.
*Water re-use in various ways, including Purified Recycled Potable water.
*Water harvesting (urban runoff; rain tanks):Water tanks on all new (and existing) developments.

Thank you for considering this submission.

Faithfully yours,

[redacted]

Jimmy Malecki

Secretary North Coast Environment Council

North East Forest Alliance

NORTH EAST FORREST ALLIANCE

Dailan Pugh OAM
NEFA Co-ordinator
[redacted]

9 September 2020

Submission to Rous County Council Future Water Project 2060

This submission focuses on the Rocky Creek Dam catchment as this has previously been the subject of a detailed investigation by the author, which culminated in the submission of the report "Rocky Creek Dam Catchment Management, an issue of regional, national and international significance" (Dailan Pugh 2000) to Rous County Council, which in part assessed the influence on forest structure on water yields and recommended:

> *The available data on catchment yields needs to be collated and a detailed water balance for the Rocky Creek Dam catchment identified for incorporation into a review of regional water supply requirements. This needs to account for the effects of vegetation structure on water yields and identify the likely increases in yields resultant from a cessation of logging.*

That report was presented to all councillors and a verbal presentation to the council was made. It is included as an Attachment to this submission.

This submission has been made at the last minute due to other commitments. Therefore only a quick scan of the documents relied upon to justify this proposal has been made, focussing on how the existing catchment has been considered, so something may have been missed. From this quick review it was assumed that MWH (2014) report Future Water Strategy Integrated Water Planning Process must be the relevant document to ascertain how catchment issues had been considered, as the catchment was not apparently considered in exhibited documents. Though no consideration of the water yields from the Rocky Creek Dam catchment was apparently attempted in any of the primary sources relied upon.

Rous County Council's website provides a glowing description of the 2900 ha catchment of Rocky Creek Dam

> *Rain falls into the catchment of Rocky Creek Dam. This catchment is a beautiful, healthy ecosystem of rainforest and is one of the best protected catchments in Australia.*
>
> *Rain filters through the diversity of the subtropical rainforest canopy, eventually landing on the leaf litter of the forest floor. Even when no rain is falling, the water vapour of mist and cloud is caught by the leaves and branches of rainforest trees, forms into droplets and runs down the tree trunks into the leaf litter. Once on the forest floor, the water flows downhill towards creeks and gullies, forming tiny streams that rapidly enter the creeks flowing into the dam.*

Not all of the water, however, stays near the surface. Some water soaks into the soil, following the roots of trees and cracks in the soil, and deeper into the ground. Eventually it flows into the groundwater, which also feeds the dam.

Though no mention of water yields from the catchment of the Rocky Creek Dam, and how this is affected by current and future vegetation structure has apparently been made. The abundant evidence I presented to Rous CC 20 years ago has apparently been ignored and Rous still refuses to prepare the needed "*detailed water balance for the Rocky Creek Dam catchment"* so as to identify future yields from the catchment into the dam.

As an example of an inherent problem with Rous County Council, in 1999 Rous Water's General Manager, Paul O'Sullivan claimed:

"For some years there has existed a concerted lobby opposed to logging in the Whian Whian State Forest (SF173) and in more recent times that group has sought to generate wider support for their objective by deliberately highlighting that the catchment of Rocky Creek Dam is within Whian Whian State Forest, and by inference, timber harvesting is putting the local water supply at risk! That inference is untrue, and Rous' comprehensive record attest to that. … Surely it is only reasonable for of (sic) all parties to avoid speculation on matters where the substantive facts are available."

In 2000 I spent months collating relevant information from 105 scientific papers, reports and other relevant documents in the mistaken belief that Rous would consider such evidence on its merits. These included a report by State Forests on the Rocky Creek Dam, which very conservatively identified a current decline in water yield of 15-23% to the dam as a result of past logging. My report stated:

All the assessments of regional water supplies to date have failed to account for the effect that the structure of the vegetation in the catchment of Rocky Creek Dam has upon water yields to the Rocky Creek Dam. As stands of oldgrowth forests in the catchment were heavily logged there were initial increases in the percentage of the rainfall running off the disturbed ground. After a few years the developing regrowth began to use more water than the original oldgrowth forest for transpiration. Water yields then began to decline until bottoming out some 20-30 years after logging at well below the original yields. The majority of the Rocky Creek Dam catchment is generally considered to be at around this stage now. Continued logging will maintain the affected area around this minima, while a cessation of logging will allow water yields to gradually increase again in line with attributes of forest maturity.

State Forests (Cornish 1997) have conservatively estimated that logging has to date resulted in an overall reduction of 15-23% (5,600 to 8,400 megalitres - ML) in water yields to Rocky Creek Dam from the catchment. Though the actual reduction may in fact be as high as 16,800 ML (Sections 4.2.1, 4.2.3). If logging was now stopped in the whole catchment then its water yield will increase over time in line with forest maturity, with something like a third (1,900 ML to 5,600 ML) of the lost yields recoverable within the next 30 years and two thirds (3,700 ML to 11,100 ML) within 60 years.

The chairman of Rous County Council, Cr. Don Harvey, dismissed my report on the catchment of the Rocky Creek Dam out of hand (Echo 9/5/2000) without any attempt to consider my evidence about water yields.

Hydrosphere Consulting Pty Ltd (2020) Rous County Council Future Water Strategy Coarse Screening Assessment of Options identifies (taking climate change into account):

> *Rous County Council has identified an expected future shortfall in water supplies for the regional bulk supply system from 2024 and a supply deficit of 6,500 ML/a in 2060.*

Despite Rous County Council, and thanks to local conservationists (including NEFA), no logging has occurred in the catchment of the Rocky Creek Dam since 1997. This means that water yields from the catchment have now passed their maximum reduction due to conversion to regrowth and are in a period of rapid recovery, and will go on recovering for the next 100 years. From my 2000 assessment it is apparent that the increasing yields from the ageing forest has the potential to meet a significant portion, if not all, of the increased water yields identified as required by 2060.

It is reprehensible that over the past 20 years that Rous has not apparently made any attempt to assess the significant increases in water yields from the Rocky Creek Dam catchment over time as the forest recovers from past logging. This is gross irresponsibility as there is no excuse for ignorance. As the saying goes, "you can lead a horse to water but you can't make him drink".

Time constraints have no enabled a reconsideration of my original 2000 report so it is attached in full. Though a more recent review of the effects of logging on water yields is presented below.

Logging Impacts on Water Yields

Of the rain that falls upon a forested catchment some is evaporated directly from leaf and ground surfaces and part may be redirected by surface flows directly into streams. Except in intense rainfall events, the majority can be expected to infiltrate the soil where it is used for transpiration by plants, with the excess contributing to groundwater seepage into streams or possibly seeping deep down to aquifers. In a natural forest situation most of the streamflow response to rainfall is provided by the groundwater system.

The eWater CRC notes:

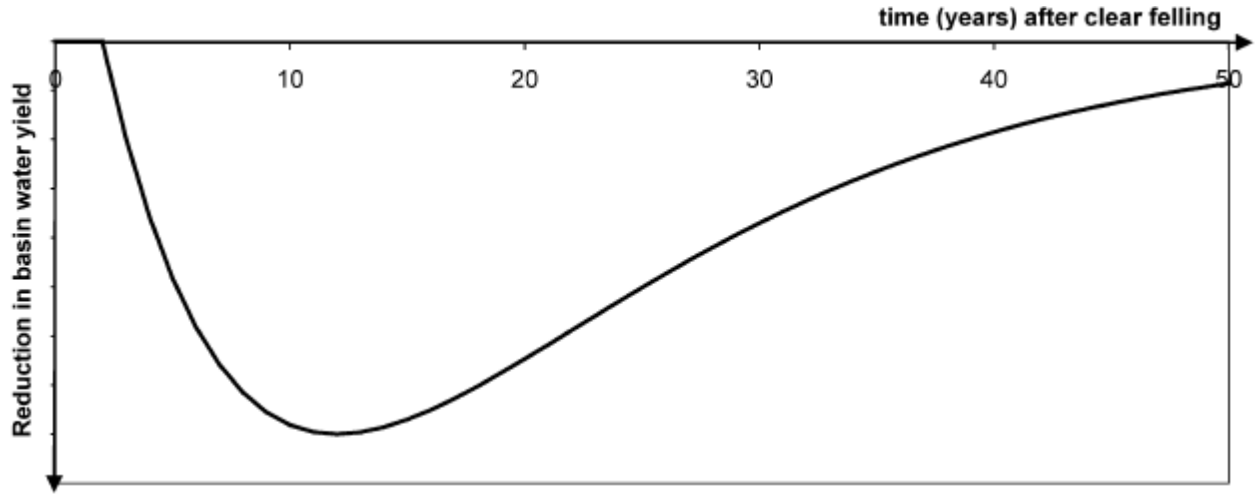
> *All plants evaporate water through their leaves. This water is extracted from the soil root zone, and the rate of evaporation depends on the weather, the available soil moisture, and the total area of leaves in the vegetation (trees and understorey). There are differences between various forest types, but basically different forests have evolved to make optimum use of the available rainfall to ensure their survival. Streamflow in drier periods is the "left-over rainfall" that passes beyond the root zone and exudes into the stream from boggy areas and the water table next to the stream. In storms, water runoff also occurs where the rainfall is intense enough to exceed the capacity of the soil to absorb it, or where the soil is already saturated. This runoff results in rapid increases in streamflow, or floods during major storms.*
>
> *For example, during an average year at a south eastern Australian catchment where the annual rainfall is 1000 mm, the forest canopy may intercept and evaporate 150 mm of the rainfall before it reaches the ground. The forest may consume a further 750 mm by plant transpiration, leaving only 100 mm to appear as streamflow (this is equivalent to a water yield of 1 megalitre per hectare). Of this 100 mm, 80 mm may occur as short-term runoff during storms, while the remaining 20 mm occurs as sustained dry-weather flow or "baseflow".*

Dargavel *et. al* (1995) note:

Streamflow is the residue of rainfall after allowing for evaporation from vegetation, changes in soil storage from year to year and deep drainage to aquifers. Forest management operations can interfere with these processes by:

> *changing the type of vegetative cover on a catchment. Experimental results show that these changes can affect evapotranspiration and therefore streamflow;*
> *changing the soil properties. The ability of the soil to both absorb and store moisture infiltration can affect the proportion of rainfall delivered. Forest operations which compact the soil can reduce both infiltration and storage capacities.*

The most significant relationship between water yields and vegetation is that related to forest age. The basic relationship between water yields and eucalypt forest age was established by studies of regrowth Mountain Ash forests following wildfires in Victoria. Kuczera (1985, cited in Vertessy *et. al*. 1998) developed an idealised curve describing the relationship between mean annual streamflow and forest age for mountain ash forest. This shows that after burning and regeneration the mean annual runoff reduces rapidly by more than 50% after which runoff slowly increases along with forest age, taking some 150 years to fully recover.



Kuczera (1985) Curve, reduction and recovery of water yields following loss of overstorey.

Tree water use has been found to be primarily related to sapwood extent, with the thickness of sapwood, and the basal area of sapwood declining as forests age, even though overall basal area increases (Dunn and Connor 1994, Roberts *et al.* 2001, Macfarlane and Silberstein 2009, Buckley *et.al.* 2012, Benyon *et. al.* 2017).

Dunn and Connor (1994) made diurnal measurements of sap velocity in 50-, 90-, 150- and 230-year-old mountain ash (*Eucalyptus regnans* F. Muell.) forests in the North Maroondah catchment finding "*The measurements have shown a significant decrease in overstorey water use with age. At the extreme, measured daily water use of the mature forest is 56% smaller than that of the regrowth forest.",* concluding:

> *There was a significant decline with age in the overstory sapwood conducting area of these forests. In order of increasing age, the values were 6.7, 6.1, 4.2 and 4.0 m^{-2} ha^{-1}, respectively. ... Annual water use decreased with forest age from 679 mm for the 50-year-old stand to 296 mm for the 230-year-old stand. ... The annual water use of the intermediate-aged stands was 610 and 365 mm for the 90- and 150-year-old stands, respectively.*

Roberts *et al.* (2001) studied water use of different aged stands of *Eucalyptus sieberi* (Silvertop Ash) within Yambulla State Forest, with an average annual rainfall of 900 mm per year, finding:

> *Stand sapwood area declined with age from 11 m^2 ha^{-1} in the 14 year old forest, to 6.5 m^2 ha^{-1} in the 45 year old forest, to 3.1 m^2 ha^{-1} in the 160 year old forest. LAI was 3.6, 4.0, and 3.4 for the 14, 45, and 160 year old plots, respectively. Because of the difference in sapwood area, plot transpiration declined with age from 2.2 mm per day in 14 year old forest, 1.4 mm per day in 45 year old forest, to 0.8 mm per day in 160 year old forest.*

Macfarlane and Silberstein (2009) assessed the water use related characteristics of regrowth and old-growth forest in the high (1200 mm $year^{-1}$) rainfall zone of jarrah forest in Western Australia, finding (SAI sapwood area index):

> *The old-growth stands had more basal area but less canopy cover, less leaf area and thinner sapwood. ...SAI of the regrowth forest at Dwellingup (7.0 m^2 ha^{-1}) was nearly double that of the old growth 3.7 m^2 ha^{-1}),..*
>
> *... At the old-growth site, daily transpiration rose from 0.4 mm day^{-1} in winter to 0.8 mm day^{-1} in spring-summer. In contrast, at the regrowth site transpiration increased from 0.8 mm day^{-1} in winter to 1.7 mm day^{-1} in spring-summer. Annual water use by the overstorey trees was estimated to be ~200 mm $year^{-1}$ for the oldgrowth stand and ~420 mm $year^{-1}$ at the regrowth stand, which is 17% and 35% of annual rainfall, respectively.*

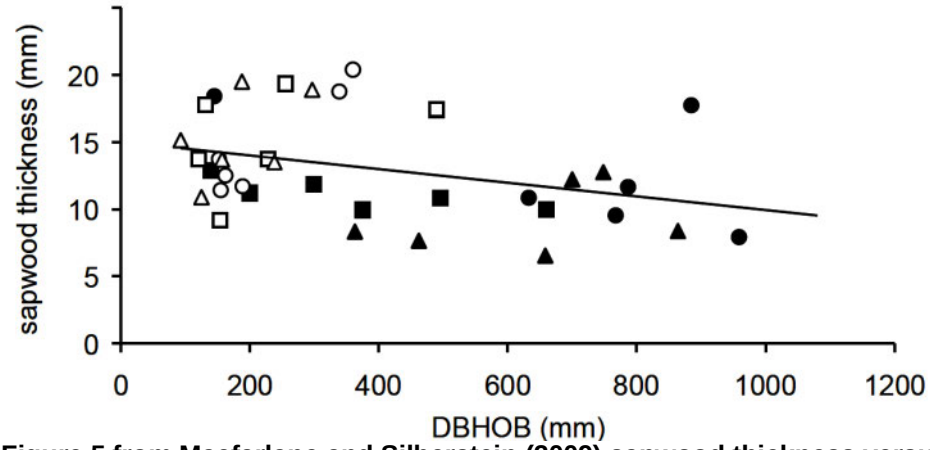


Figure 5 from Macfarlane and Silberstein (2009) sapwood thickness versus tree diameter (measured at breast height over bark, DBHOB) at the old-growth (closed symbols) and regrowth (open symbols) study sites.

For 'actual evapotranspiration' (E_a) Benyon *et. al.* (2017) identify:

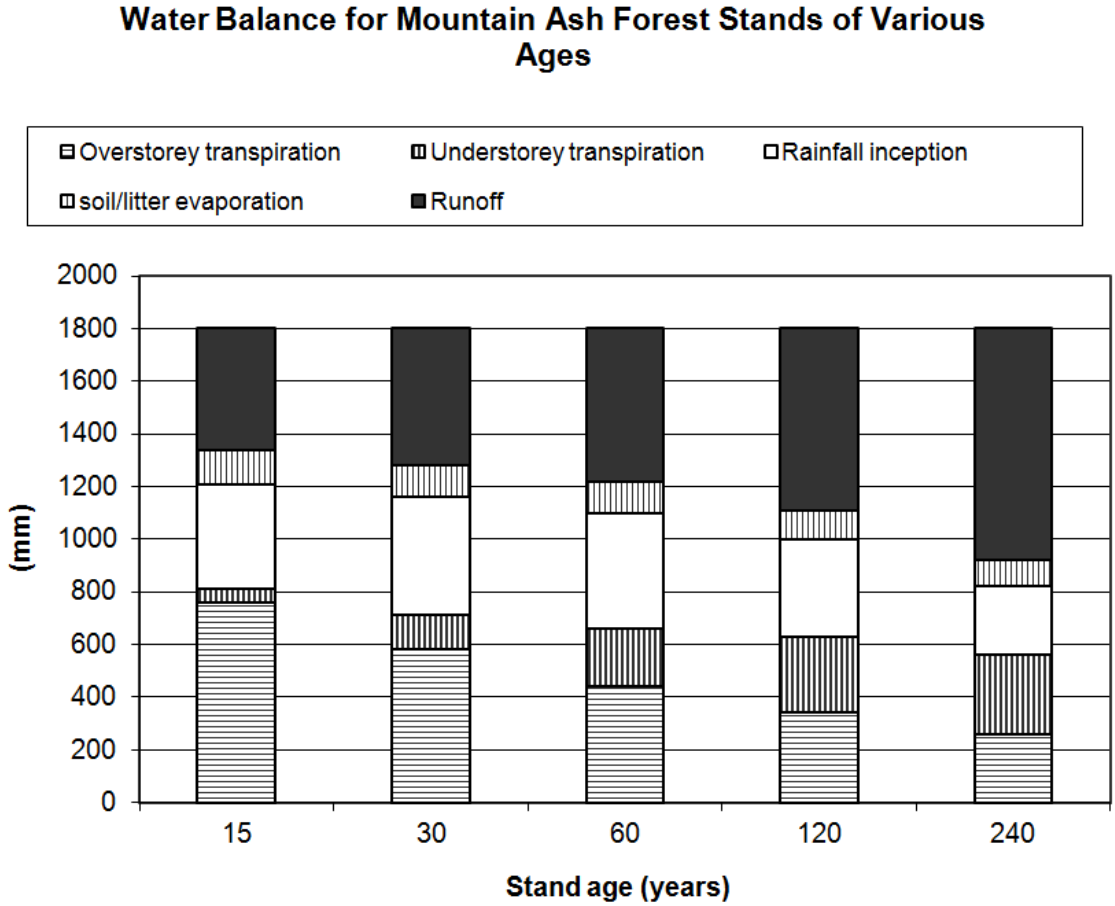
> *... in even-aged eucalypt forests in south-eastern Australia, catchment mean overstorey sapwood area index (SAI), estimated from a relationship between stand mean sapwood thickness and tree density (trees ha^{-1}), applied to repeated measurements of tree density and mean tree diameter over several decades, was strongly correlated with catchment mean annual E_a, estimated as annual precipitation minus annual streamflow (Benyon et al., 2015).*

From their study of Mountain Ash forests, Benyon *et. al.* (2017) concluded (E_a actual evapotranspiration, SAI sapwood area index):

> *In non-water-limited eucalypt forests, overstorey sapwood area index is strongly correlated with annual overstorey transpiration and total evapotranspiration. Interception loss from the overstorey is also positively correlated with overstorey SAI.*

... Variation in SAI explained almost 90% of the between-plot variation in annual E_a across three separate studies in non-water-limited eucalypt forests. Our results support the use of measured spatial and temporal variations in SAI for mapping mean annual E_a (Jaskierniak et al., 2015b) and for modelling longterm streamflows in ungauged catchments (Jaskierniak et al.,2016).

Vertessy *et. al.* (1998) have attempted to quantify the different components of rainfall lost by evapo-transpiration, identifying them as: interception by the forest canopy and then evaporated back into the atmosphere; evaporation from leaf litter and soil surfaces; transpiration by overstorey vegetation; and transpiration by understorey vegetation. All of these have been measured as declining with increasing forest maturity, with the exception of understorey transpiration which becomes more important as transpiration from the emergent eucalypts declines.



Water balance for Mountain Ash forest stands of various ages, assuming annual rainfall of 1800 mm (from Vertessy et. al. 1998)

The generalised pattern following heavy and extensive logging of an oldgrowth forest is for there to be an initial increase in runoff from disturbed areas peaking after 1 or 2 years and persisting for a few years. Water yields then begin to decline below that of the oldgrowth as the regrowth uses more water. Water yields are likely to reach a minimum after 2 or 3 decades before slowly increasing towards pre-logging levels in line with forest maturity.

For Mountain Ash forest in Victoria, a mean annual rainfall of 1,800 mm/yr has been found to generate a mean annual runoff from oldgrowth Mountain Ash forest of about 1,200 mm/yr (Kuzcera 1987, Vertessy *et. al.* 1998). After burning and regeneration the mean annual runoff reduces rapidly by more than 50% to 580 mm/yr by age 27 years, after which runoff

slowly increases along with forest age, taking some 150 years to fully recover (Kuzcera 1987). Following clearfelling of a forest there may or may not be an initial increase in water yields for a relatively limited period. Thereafter water yields usually decline relatively rapidly in relation to growth indices of the regrowth, after some decades maximum transpiration of the regrowth is reached and water yields begin to recover with increasing forest maturity.

In the Barrington Tops area Cornish (1993) found that "water yield decline exceeded 250 mm in the sixth year after logging in the catchment with the highest stocking of regeneration and the highest regrowth basal area". This represents a major reduction given that the mean runoff pre-logging was only 362 mm (38-678 mm) and that only 61% of its catchment was logged.

Cornish and Vertessy (2001) report that the yields kept declining:

> *Water yields in a regrowth eucalypt forest were found to increase initially and then to decline below pre-treatment levels during the 16-year period which followed the logging of a moist old-growth eucalypt forest in Eastern Australia. ... Yield reductions of up to a maximum 600 mm per year in logged and regenerated areas were in accord with water yield reductions observed in Mountain Ash (Eucalyptus regnans F.J. Muell.) regeneration in Victoria. This study therefore represents the first confirmation of these Maroondah Mountain Ash results in another forest type that has also undergone eucalypt-to-eucalypt succession. Baseflow analysis indicated that baseflow and stormflow both increased after logging, with stormflow increases dominant in catchments with shallower soils. The lower runoff observed when the regenerating forest was aged 13–16 years was principally a consequence of lower baseflow.*

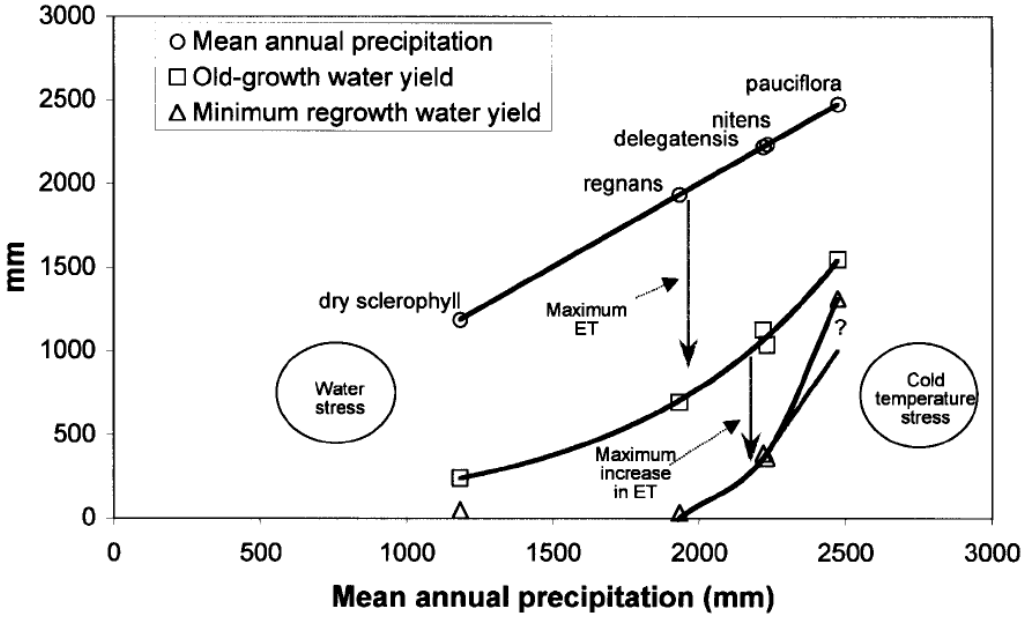
Cornish and Vertessy (2001) elaborate:

> *This analysis indicates that (in common with the results of many previous studies, e.g. Bosch and Hewlett, 1982) canopy removal increased water yield substantially. Mean increases here were frequently significant while the regrowth trees were less than 3 years old. As the trees increased in age water use increased, but mean water use was not significantly different from the pre-treatment forest between ages 3 and 12. Water yields then declined further between ages 13 and 16 years, resulting in mean reductions being statistically significant in all but one catchment.*

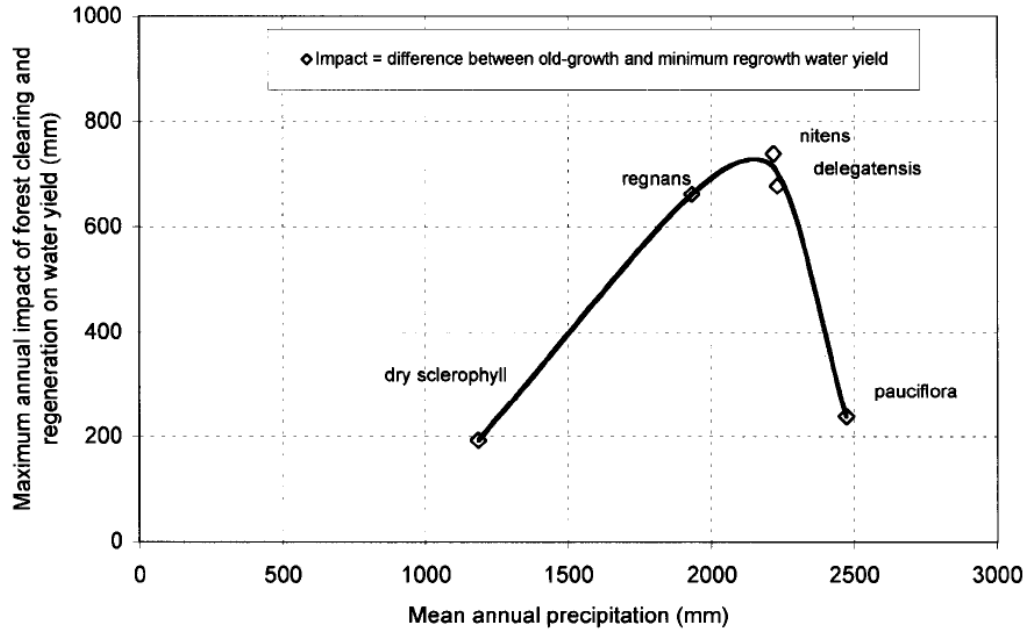
Vertessy (1999) notes that "the maximum decrease in annual streamflow is over 60 mm per 10% of forest area treated, which is similar to the maximum reductions noted for Victorian mountain ash forests".

The process of increasing water use by regrowth is relatively well understood and has been found to apply across forests, though localised impacts are complicated by varying vegetation types and conditions within a catchment, the depth of soils, rainfall and a multitude of environmental variables, and the compounding effects of events over time.

For example Peel *et. al.* (2000) undertook modelling in the Maroondah and Thomson catchments to identify the variations in water yield depressions according to forest types and rainfall.



Summary of simulated impacts of forest clearing and regeneration on water yield, showing the relationship between species, precipitation, and water yields. From Peel *et. al.* (2000)



Relationship between species, precipitation and maximum impact of regeneration on water yields. From Peel *et. al.* (2000)

Given the abundant evidence of how forest maturity affects water yields and the significance of the impacts it is grossly irresponsible for Rous County Council not to have taken this into consideration. They have not done due diligence.

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PROPOSED DUNNON DAM

Marion Conrow

Dear Rous County

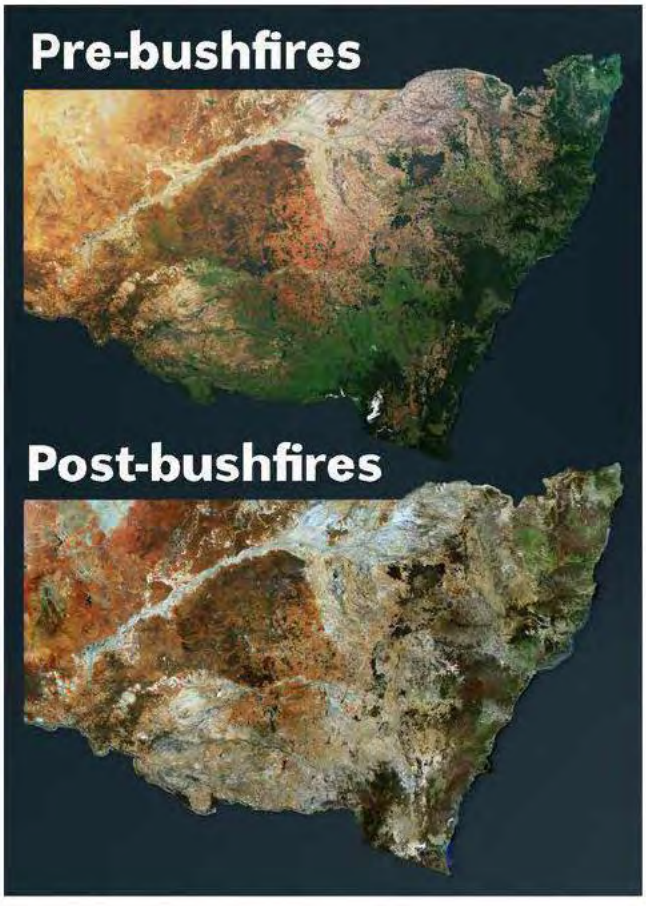
I write and let you know that I OBJECT proposed Dunoon Dam, that area is one of incredible beauty and habitat, its a magic place and the thought of it being destroyed for human consumption has left me in personal depression and despair. People are moving here for THAT nature and beauty, lets not remove one of the few magical places left. To put all our eggs in one basket is not wise in times of uncertainty. Many solutions will build A solution. Here are my concerns/ opinions:

INFORMATION:
The information seems inconsistent with the commissioned video flood model by QUT being incorrect and acting as a sales video more than informational. On your site the DUNOON DAM is not highlighted, its washed into a sustainable water plan.

SITE SIGNIFICANCE
This land is prime agriculture, realestate and tourism country. It also has significant aboriginal sites which have been dismissed and minimised.

The Northern Rivers is beautiful and with so few pockets of such beauty and habitat to flood this is criminal.

DEFORESTATION/FIRES After fires there is still some forest but much of that is now devoid of habitat. This picture illustrates a HUGE problem ahead, its going to get very hot. Our rate of clear felling habitat means Australia is one of the worlds leading deforesters. Habitat is more precious than humans inefficient use of water. We need to build a future not a desert.



WATER

- Is a precious resource, but also here we have huge deluges which cause damage.
- Water harvesting needs HAVE to be accommodated.
- We have a pipeline from here to Ballina for water, its called a river, let clean up the river so the water is useable again.
- Our Forests help with retaining moisture, transpiration and therefore rainfall, with planet temperature increases every bit of moist ground cover MUST be kept.

WATER USAGE

- Water is needed, but our use of water has to change:
- Every house should have a water tank (preferably 10000litres.
- Flushable toilets should be replaced by non water use ones helping with sewerage issues as well. Those that do flush should not use drinking water.
  "Over time the level of possible savings is not insignificant. In one scenario modelled, for example, in which air assisted flush toilets slowly grew to 50% of the toilet market starting in 2010, the annual estimated water savings in 2050 in Sydney would be 20GL and while in Melbourne it would be 18GL." *
- Ballina can use salt water for non potable uses. Evaporation techniques will become cheaper.
- We need to use less water in general. There is necessary use, but as mentioned flushing toilets WASTES too much water
- A daily limit during dry times needs to be practiced.
- Our hidden ground water needs to be assessed a fiercely protected.

FARMING

I am not a farming expert, we do need dairy, but cows drink at least 40 litres per day,

"High-producing milking **cows can** consume up to 200L/day of **water**, while sheep **can drink** 40% **more** during summer than winter. In extreme temperatures sheep and **cattle can** consume up to 80% **more water** but **will** avoid warm **water**, so it is important to supply deep or shaded **water** sources."
https://www.agric.wa.gov.au/small-landholders-western-australia/livestock-water-requirements-and-water-budgeting-south-west

Sustainable crops and Livestock is a desert country need to be addressed. Water usage, and alternate sources for Australia is essential, we are not "sodden ol' England" where many of our farming practices have come from. We ALL need to change how we live.

Trees for shade should be a law, seeing animals with no shade in 45 degree heat is criminal. (Most farmers I know do it right though).

FUTURE COMMODITIES

We are in a generation/ era of economic rationalism and everything is money. In the future our measurements will not be just financial,

- Wellness will be a commodity, less stress will become a commodity,
- Nature in it untouched beauty will be the richest commodity with so little of it left.
- Culture will be a commodity

- Trees are a commodity but saving our flora and fauna will be commodities. If each established tree is worth $200000 would we chop it down for wood chip to fire a sugar mill?? If that tree supplies SHADE what is that worth.
- SHADE will be a commodity.
- WATER IS A COMMODITY THAT IS REGULARLY STOLEN.

*ANALYSIS OF AUSTRALIAN OPPORTUNITIES FOR MORE WATER-EFFICIENT TOILETS For The Australian Government Department of the Environment, Water, Heritage and the Arts. Authors:Anna Schlunke, James Lewis and Simon Fane Institute for Sustainable Futures © UTS 2008

Table I Comparison of efficient toilet classes included in the study

Toilet class	WELS rating*	Ave flush **	AS inclusion*	Status
Dual flush; 4.5/3L	4 Star	3.1L – 3.5L	Y	Sold in Aus
Basin–integrated; 4.5/3L	5 Star	> 3L	Y	Sold in Aus
Dual flush; 4/2L	(5 or 6 Star)	2.4L - 2.7L	N	Sold in EU
Urine-separating; 4/0.2L or 6/0.2L	(6 Star)	1 L -1.4 L#	N	Sold in EU
Dual flush; 3/2L	(6 Star)	2.2 L	N	R&D needed
Air assisted	(6 Star)	1.5 L	N	Prototype

*Achieving a WELS rating requires inclusion within the Australian standard for Cisterns (AS 1172.2)

** The average flush volume of a dual flush toilet is taken as one full flush and four half flushes

This average flush volume is reliant on various behavior changes regarding toilet usage

Feedback Submission Re: Proposed Dunoon Dam within the Future Water Project 2060

To: General Manager, Rous County Council
PO Box 230, Lismore NSW 2480

From: Peta Wright

Address: [redacted]

Firstly, the community appreciates the submission extension. We also acknowledge the complexity of the work Rous does to provide water for our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency.** This is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption.[1]
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century by swallowing all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites.[2]
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest**, threatened flora and fauna species.[3] Rous's plan to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone is problematic as the type of vegetation offered as recompense is not equivalent.(Nan Nicholson, botanist) Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."[4] Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.
- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water**. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous-supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks diverting expenditure away from more sustainable, flexible and effective solutions.[5]

I SUPPORT these alternatives:

We need a suite of smart water options and proven alternatives, not a huge new dam. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. *(We understand Rous has not costed this in creating their future water plan)* Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.[6] [7]

Feedback Submission Re: Proposed Dunoon Dam within the Future Water Project 2060

To: General Manager, Rous County Council
PO Box 230, Lismore NSW 2480

From: _____

Address: [redacted] _____

_____

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- **Lost opportunity to invest in system-wide water efficiency**. This is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption.*(1)*
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century by swallowing all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites.*(2)*
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest**, threatened flora and fauna species.*(3)* Rous's plan to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone is problematic as the type of vegetation offered as recompense is not equivalent.(Nan Nicholson, botanist) Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."(4) Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.
- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
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- **The small population increase** predicted for the four Rous-supplied councils of 12,720(5) between 2020-2060 **does not justify** such a large and destructive dam. The dam risks diverting expenditure away from more sustainable, flexible and effective solutions.(5)

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- **Water re-use in various ways, including Purified Recycled Potable water.** A wealth of global research and experience exists regarding potable reuse of water.[8] Eg: The city of Windhoek in Namibia has been using purified recycled water for 30 years using advanced technology.[9]
- **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."[10] Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[11]
- **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- **Groundwater, where this is environmentally safe.** The Australian government provides a lot of information on the ecological impacts and groundwater usage.[12]

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections>
Scroll down to "Local Government Factsheets".
(6) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options*, Rous County Council, Lismore.
(7) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water*, Institute for Sustainable Futures, Sydney.
(8) Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?,* Water Research Australia Limited, Adelaide.
(9) Windhoek Goreangab Operating Company (Pty) Ltd 2020,*Our history | Wingoc,* Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(10) $220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(11) Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home*, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
(12) Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment,* Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Kind regards, Signature: ___ [redacted] _____ Date:_____

DUNOON DAM SUBMISSION - ‘ FUTURE WATER PROJECT 2060’

I am writing to voice my opposition to the preferred option of Dunoon Dam as a solution to increased water demand up to 2060. I know there are more sustainable ways to address this issue but fear that due to the ‘regional service delivery’ vision of Rous, it is not up to this crucial task.

Dams are clearly associated with the old 20th-century-thinking that has not served us well. By way of example we now have a dam on Rocky Creek that can’t meet future supply needs. Building another dam simply recreates this situation presumably around 2060!

As a north coast community we must meet the challenge of embracing water saving and water recovery and re-use technologies that have been proven both in Australia and overseas and I know there are many. If a dam was not possible that is exactly what we would be doing!

I am concerned that the figures used in the reports commissioned by Rous are incorrect and/or not refined enough and therefore don’t give the full picture making a dam seem the better option. I know many other learned technical experts are voicing these concerns in their submissions to Rous.

Old thinking also assumes that all damage caused by constructing the dam can be offset. Once again I know that learned experts are voicing their concerns to Rous about the damage dam construction would cause to unique ecological communities and their dependent flora and fauna. Uniqueness cannot be offset. Ignoring the real cost to NSW and Australia caused by the loss of the unique rainforest which will be erased is unconscionable.

Old thinking assumes that Aboriginal sites can be damaged with impunity by applying for a ‘consent to destroy’. I doubt this thinking will safeguard a dam project with legislative change underway in NSW and the actions of Rio Tinto and other corporate resource extractors under the spotlight. What an invidious position for Rous to place itself in willingly.

If Rous continues down the dam building road I think it will be surprised at the depth and level of community opposition to what’s coming across as more of the old thinking that has lead our exhausted and increasingly fragile world to the brink. I urge Rous to step back and listen to the learned experts who are making cogent and well-researched arguments in support of restoring a healthy north coast and respecting our indigenous elders and leaders.

Yours sincerely

Dianne Mackey
[redacted]

9 September 2020

Richmond Landcare Inc.
[redacted]

9th September 2020

Attention: Keith Williams (Chair)
Rous County Council members

RE: Feedback Submission to the Future Water Project 2060 from Richmond Landcare Incorporated

Dear Mr. Williams et al,

Thank you for the opportunity to comment on the Future Water Project 2060.

Richmond Landcare Incorporated (RLI) is a non-profit community led Landcare network whose mission is inspiring and supporting the community in caring for the Richmond River Catchment. RLI is apolitical and seeks to facilitate and advocate for individuals, groups, and the wider community for Landcare.

RLI does not support the proposal for the Dunoon Dam and the groundwater augmentation options identified as key actions in the Future Water Project 2060 community information brochure.

The following are comments supporting our position:

1) Environmental impacts

a) There will be a loss of:
   - of 34 ha of Lowland Rainforest Endangered Ecological Community including 7ha of warm-temperate Rainforest on Sandstone.
   - nine threatened flora species
   - habitat for 17 species of threatened fauna, including koalas
   - connectivity for local wildlife corridors
   - habitat for platypus

b) The changes in the amount, velocity and timing of downstream flows will adversely affect existing aquatic plants and animals. The erection of a 40m barrier will severely impact the ability of species such as eels to migrate upstream to food sources.

c) Impacts are likely to be more extensive than reported in terrestrial and aquatic ecology reports and it is suggested that these need further investigation due to the complexity of the ecosystem.

d) The proposed dam area is home to prime cropping, pecan and livestock food production areas. These areas produce food or inputs to food production.

e) The construction of the dam will involve its own set of very considerable environmental impacts in regards to materials, emissions etc.

f) Groundwater is only an option in certain limited situations. The Australian government provides a lot of information on the ecological impacts and groundwater usage.

2) The Indigenous Heritage Impacts

Reconciliation and respecting our indigenous heritage are fundamental values of modern Australia. Landscape and the environment were intwined with indigenous values, lifestyle and spirituality.
It is a concern that the cultural heritage study of the dam site has not been made public however we know that:

i) The valley to be inundated has 9 recorded burial sites.
ii) In the adjacent area (only described as Dunoon) ancient clay figures of a koala and a human head estimated at several thousand years old were uncovered in 1953
iii) grinding stones have been located on ridge just above the dam landscape.
iv) Dorrobee grasslands, an indigenous fire managed landscape is nearby,
v) Upstream is a clan size habitable cave with a waterfall overhead. Upstream also is Whian Whian Falls – also a likely significant site.

Many parts of this valley have maintained the natural landscape. Flooding of the valley carries the risks of losing indigenous cultural heritage.

3) Member Group's Landcare work impacted in the construction of the dam.

Local Landcare groups have active sites and have carried out Landcare activities on public and private lands in the area including fencing riparian zones, replanting trees and providing off stream watering for the landholder's cattle. These groups have invested their volunteer efforts and these works will be impacted both directly and indirectly by the proposed dam.

We would not like to see any Landcare restoration sites destroyed as it does not respect the volunteers or landholder's goodwill and impacts the environmental outcomes created at these sites.

4) Adoption of Best Practise Water Management.

Because of their large environmental and economic footprints, we do not consider large dams or groundwater extraction as acceptable water supply options.

Some suggested best practise options for this region:

- We have amongst the highest rainfall in the state and the roofed buildings which the bulk water supply is designed to service could reduce or obviate the need to draw on the bulk water supply. Tanks on large buildings including schools, commercial buildings and centres would be highly effective. Mandatory and sufficient tanks on buildings wherever possible, even retrofitting. Urban runoff could also be utilised.

- There is a 17% leakage factor in the current system. Repairing and stopping these leaks would make a marked difference in water savings and efficient investment of funds.

Richmond Landcare Inc.
[redacted]

- Reduce water use by engaging in a community awareness program that includes the adoption of new technologies, encourage the adoption of minimal toilets and showers and native gardens.

- Adopt technologies that enable various qualities of water to be used, depending on the purpose.

It would be appreciated if these concerns are addressed in your review of public submissions.

Yours Sincerely

Richmond Landcare Incorporated Committee

[redacted]

9 September 2020

Mr B and Mrs S Shoebridge
[redacted]

Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

As Lismore natives we are very concerned about the region's future and particularly it's water needs in these changing times. It is good to see such importance placed on water, especially after the region has had to fiercely defend its water security from the threats of Coal Seam Gas mining and Water Mining in recent years. Clearly the first thing to do when talking about protecting water security is to remove the threats to water supplies. These activities have been shown to deplete and contaminate ground water supplies and completely depressurise the local water tables so any and all Future Water planning must involve putting meaningful and enforceable safeguards in place. The water issue alone should have protected the Northern Rivers community from unconventional gas mining, but it didn't.

We feel it is wise to plan for the future and can appreciate the complexities of the issues and Rous Water's role but we are moved to lodge a submission after learning about the proposed Channon-Dunoon Dam.

The greatest tragedy to befall our region was the complete decimation of the original Big Scrub. It is gobsmacking to contemplate what our region would have looked like if the cedar getters hadn't been so destructive and stripped the landscape bare. The area where this dam has been proposed has a rare and precious beauty that is intrinsic to the Northern Rivers identity. The proposal to flood this basin when there are more suitable options is totally inappropriate in our view and should be abandoned. We don't feel there is sufficient need for a dam at Dunoon, especially one three times the size of the present dam and four times the cost. We are greatly concerned about the destruction of our unique environment and are worried about the loss of community and character that this next step towards urban sprawl would result in.

It feels like another disaster in the making - a classic 'one thought solution' like the 'rape of the big scrub' and so many other decisions that have robbed us of our natural heritage and diminished our sense of place. I urge you, please don't make a mistake of this magnitude - it is irreversible. But rather delve deeper into the complexities and find a more sustainable solution such as those listed below.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- Dunoon is the "Macadamia Capital' of Australia, and possibly the globe. But there are dangerous chemicals used in macadamia farming in Australia that have been banned elsewhere around the globe. These chemicals could easily find their way into the water supply given its close proximity, run off effects, aerial spraying etc. This becomes a major public health risk and we can not envisage the macadamia industry moving their operations.
- Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government) (1)

• The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

- The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

• Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011) (2) . Ongoing disregard for First Nations' heritage.

• Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011) (3) .

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist).

Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments. (4)

Rous is required to avoid this destruction because there are economically viable and more effective solutions.

• Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
• Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
• The small population increase predicted for the four Rous-supplied councils of 12,720 (5) between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur , diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020,
< https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > scroll down to "Local Government Factsheets". (5)
• Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011) (6)
• Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.
• An investment in system-wide water efficiency and strong demand management.

Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply. (7) (8)
Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible. (9) (Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
• Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience? https://www.waterra.com.au/publications/document-search/?download=1806 (9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history (10)
• Water harvesting (urban runoff; rain tanks): Water tanks on all new (and existing) developments. (11) This builds community resilience - much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks. (12) https://www.yourhome.gov.au/water/rainwater
• Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
• Groundwater, where this is environmentally safe The Australian government provides a lot of information on the ecological impacts and groundwater usage. (13)
https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground water-drawdown
With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Thank you for your consideration and leadership on this issue.

Please protect the uniqueness of our region and proceed with caution.

For a safe, clean and sustainable future

Brendan and Stephanie Shoebridge

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, < https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections > Scroll down to "Local Government Factsheets".
(6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia.
(7) The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy : preferred options , Rous County Council, Lismore.
(8) Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water , Institute for Sustainable Futures, Sydney.
(9) Stuart White, 2020 www.bit.ly/Prof-Stuart-White-Rous-slides)
(10)Kahn,Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide.
(11)Windhoek Goreangab Operating Company (Pty) Ltd 2020 ,Our history | Wingoc, Veolia Environment, Windhoek, viewed 3 August 2020, < https://www.wingoc.com.na/ >
(12)$220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(13)Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home , Canberra, viewed 3 August 2020, < https://www.yourhome.gov.au/water/rainwater >
(14)Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, < https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown >

Feedback Submission Re: Proposed Dunoon Dam within the Future Water Project 2060

To: General Manager, Rous County Council
PO Box 230, Lismore NSW 2480

From: Saul Francis Dalton

Address: [redacted]

Firstly, the community appreciates the submission extension. We also acknowledge the complexity of the work Rous does to provide water for our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency**. This is the cheapest & fastest way to ensure supply demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption.[1]
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century by swallowing all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites.[2]
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest**, threatened flora and fauna species.[3] Rous's plan to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone is problematic as the type of vegetation offered as recompense is not equivalent.(Nan Nicholson, botanist) Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."[4] Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.
- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks diverting expenditure away from more sustainable, flexible and effective solutions.[5]

I SUPPORT these alternatives:

We need a suite of smart water options and proven alternatives, not a huge new dam. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. *(We understand Rous has not costed this in creating their future water plan)* Existing research over the past decade consistently finds that the best 'bang-for buck' investment in water supply comes from demand management and identifying savings within the existing supply.[6] [7]

- **Water re-use in various ways, including Purified Recycled Potable water.** A wealth of global research and experience exists regarding potable reuse of water.[8] Eg: The city of Windhoek in Namibia has been using purified recycled water for 30 years using advanced technology.[9]
- **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."[10] Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[11]
- **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- **Groundwater, where this is environmentally safe.** The Australian government provides a lot of information on the ecological impacts and groundwater usage.[12]

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011

(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011

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(5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections>
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(6) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options*, Rous County Council, Lismore.

(7) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water*, Institute for Sustainable Futures, Sydney.

(8) Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?*, Water Research Australia Limited, Adelaide.

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(12) Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment*, Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Rous County Council
Future Water Project 2060
Feedback Submission – David Fligelman and Ian Law

Revision	Date	Description	Prepared by
A	September 9, 2020	For Submission to Rous County Council	David Fligelman, Ian Law

David Fligelman
[redacted]

TABLE OF CONTENTS

1 PURPOSE OF THIS SUBMISSION

Best practice in the selection of future bulk water supply options centres on identification and assessment of all viable options such as demand reduction, surface water, groundwater, desalination, potable reuse, and stormwater in the specific context of each catchment or region. The investigations and evaluations need to consider a large number of factors - including water demand, standards of service, environmental impacts, topography, existing infrastructure, climatic, seasonal, cultural, social, community expectations, and of course, costs. Ultimately, these analyses are used to rank and select the preferred water sources on their merits. The documents provided for the Future Water Project indicate that Rous County Council has vigorously pursued this approach. However, within this, the documentation reveals that the potable reuse investigations undertaken to date have not accurately represented some key attributes of potable reuse, and further, that these issues in the analysis have prevented potable reuse from being considered on its merits.

To this end, this submission is provided to identify the areas in which the current Future Water Project reports are incomplete or inaccurate in relation to potable reuse, provide additional information in relation to the technical attributes and potential of potable reuse in the context of Rous County, and highlight the need for further investigation and consideration of potable reuse as a part of the region's future bulk water supply – particularly in light of the environmental, cultural and economic issues presented by the preferred option (Dunoon Dam).

The key documents reviewed as a part of this submission comprise:

- Integrated Water Cycle Management Development: Assessment of Augmentation Scenarios, Hydrosphere Consulting, Rev 2, 9 June 2020
- Preliminary Feasibility Report, Investigation of Water Reuse as an Additional Water Source, City Water Technology, Rev B, May 29 2020
- Flyover Virtual Landscape Model (https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-JLH-42-35-07)

2 INTRODUCTION

This submission has been prepared by David Fligelman with extensive contributions from Ian Law.

David Fligelman is a chemical engineer with more than 20 years' experience in wastewater treatment, biosolids management and advanced water recycling. David's company, Tyr Group, has operated out of Bangalow since 2006. Tyr Group's team of four process engineers provides specialist consulting services in wastewater treatment and recycled water production to municipal water authorities, large international consultancies and contractors throughout Australia's eastern states.

David's specific experience in process design, validation and HACCP for treatment for high quality recycled water extends back to 2005, and includes the following key roles:

- Technology leader for the Pimpama-Coomera WaterFuture Alliance, which included the largest a Class A+ non-potable reuse scheme in Australia, with an ultimate connected population of 150,000. This role extended from 2006-2010, and covered all process aspects of the wastewater treatment and recycled water treatment plant designs, commissioning, performance testing and validation.
- Design and development of an early pilot plant for the Gibson Island Advanced Water Treatment Plant (2007). The early pilot was used to make critical decisions on membrane selection and plant design for the Western Corridor Purified Recycled Water project which is to generate power station cooling and water supply replenishment within Wivenhoe Dam.
- Delivered a Technical Feasibility Assessment of Indirect Potable Reuse of recycled water from Merrimac WWTP to Hinze Dam to support Gold Coast Water's Emergency Bulk Water Supply Strategy (2005) (with Ian Law). This included concept design, costing, analysis and evaluation of a 40 ML/d of a dual-membrane advanced water treatment plant, and transfer of the water to Hinze Dam.
- Technical project advisor to the Robust Water Recycling (Antarctica) project on behalf of the Australian Recycled Water Centre of Excellence (2013-2015). The project centred on research and development of an AWTP for remote potable

reuse and associated validation and verification of performance. The plant developed as a part of this project is currently operating at Davis Station.

Ian Law is a Chemical Engineer with a Masters Degree in Public Health Engineering obtained from the University of Cape Town in South Africa, an Adjunct Professor at the University of Queensland and a Fellow of the Singapore Water Academy. Ian has more than 35 years of experience in advanced treatment and reuse projects in Southern Africa, S E Asia and Australia, and is widely recognised both nationally and internationally as a leading specialist in potable reuse. A few highlights of Ian's career in potable reuse include:

- Project Manager for the design and implementation of the 10 ML/d dual membrane demonstration plant in Singapore.
- Project Director for design, construction and commissioning of three Advanced Water Treatment Plants (AWTPs) totalling more than 75 ML/d in Singapore.
- Appointed in 2018 by Sydney Water to overview the design of a 7 ML/d Demonstration Plant that will showcase modern-day advanced water reuse technologies and treatment trains,
- Appointed by the ACT Government to an Expert Panel on Health to advised on the implications of implementing Indirect Potable reuse in Canberra including an overview of the technologies in AWTPs.
- Served as a member of the Research Team for the WateReuse Research Foundation's project WRF 11-02: Equivalency of Advanced Treatment Trains for Potable Reuse.
- Appointed by the Water Corporation in Western Australia in 2010 to review, and advise on its 5 ML/day dual membrane water reclamation demonstration plant to be located at the Beenyup WWTP in Perth.
- Appointed by Veolia Water in 2007 to provide technical input and guidance to the firm in its position of Operator for the Western Corridor Project in S E Queensland.
- Project Director for the planning, design and implementation of the NEWater Visitor Centre in Singapore.

Currently serves on Seqwater's Social Research Advisory Panel that has the aim of overviewing and advising on Seqwater's outreach program on implementing purified recycled water

Ian is also currently assisting in Tweed Shire Council's Water Management Options project, evaluating all options for securing the Council's water supply into the future. Ian's role is specifically to address the Purified Recycled Water (PRW) option.

Tyr Group, together with Ian Law, submitted a proposal to deliver the Investigation of Indirect Potable Reuse for Rous County Council in September 2019. While the proposal was not selected, feedback from the RCC's assessment of the tenders indicated that the Tyr Group proposal was rated highest on a technical basis.

3 SECURE YIELD OF POTABLE REUSE OPTIONS

The IWCM report concludes that "IPR schemes have a low yield benefit and a potentially high cost. There is also a significant risk that the scheme would not meet public health requirements. Hence IPR has not been considered further."

The assessments presented in Water Reuse Investigation, and applied to the IWCM Report, have been based on a number of assumptions which limit the expected yield to the very minimum which might be expected. Further analysis is required to ascertain the validity of these assumptions, and the secure water yield which can be achieved through potable reuse revised accordingly. Based on the factors outlined in the following sections, and general expectations for conditions in each of the wastewater catchments, it is reasonable to expect that a dramatic increase in the secure yield offered by potable reuse on reconsideration and refinement of these assumptions. Depending on the findings of additional analysis of these factors, potable reuse alone, or in combination with the Alstonville groundwater source, may have the ability to meet the projected demand through to 2060 (and beyond).

3.1 Failure to Consider Reuse from Byron and Brunswick Valley STPs

The Water Reuse Investigation Report eliminated Byron Bay or Brunswick Valley STPs as potential sites for potable reuse due based on "their remote location." Further issues were raised regarding the "the areas surrounding these WWTPs is dominated by national parks and conservation areas, further increasing the complexity of delivering treated effluent to nearby raw water sources" and "significant elevation changes, with Rocky Creek Dam, sits at 200 m above sea level, whilst the WWTPs are close to sea level meaning transport of effluent or recycled water would introduce significant hydraulic considerations and operating expense."

The exclusion of these sources ignore that these two plants may represent one of the most valuable sources for purified recycled water in the region as:

- Purified recycled water generated at Byron STP could be readily transferred to the existing Wilson River Intake (for transfer to Nightcap) via:
    - A pipeline along Ewingsdale Road and the adjacent to the Pacific Motorway.
    - Discharge to Byron Creek in the vicinity of Bangalow. The static head for this transfer would be in the order of 60-70m. It may be feasible to utilise the existing road tunnel for the pipeline.
    - Gravity flow to the Wilson River via Byron Creek (through Bangalow).
- With a relatively minor amount of additional pipework (and additional head), the purified recycled water from Byron could be directed to Emigrant Creek. This would provide RCC with the opportunity to control the PRW inflows to either of their major storages as required.
- Effluent from Brunswick Valley STP could be transferred to Byron STP for treatment to purified recycled water to provide an additional source.
- The effluent discharged from the wetlands downstream of Byron STP is currently elevating the water table on local farmland, and creating significant issues. As such, diversion of the effluent to and advanced water treatment plant and effectively "returning to the catchment from which it came", and alleviate the local issues (during dry weather at least).
- During dry periods, the purified recycled water releases to Byron Creek to the Wilson River could be undertaken achieve environmental benefits in that waterway.

Water losses in Byron Creek (or Emigrant Creek) would need to be considered in establishing the secure yield of this scheme, but intermittent discharges, mimicking natural rain events, may assist. Further, as the discharges are upstream of the Eltham gauge, this scheme may require less regulatory adjustments than the Lismore based scheme.

In regard to power consumption, even with the 60-70m lift to Bangalow, followed by the 200m lift from the existing Wilsons River Source to Nightcap, the power consumption for this option would be expected to be lower than desalination.

3.2 Non-Potable Reuse

The non-potable reuse targets of a number of shires are considered ambitious. There is a long history of the planning for non-potable reuse (and third pipe schemes in particular) targeting reuse of a large proportion of the STP effluent stream, but being unable to achieve or maintain that level of performance in practice. Additionally, the cost of constructing, operating and maintaining dual reticulation schemes is very high – especially when considered on a per kL basis.

The history of the Pimpama Recycled Water project on the Gold Coast, which was the largest dual reticulation project in Australia, illustrates this issue. While the planning for the scheme was based on reducing the potable water demand for new houses in the region to just 16% of that for typical residential developments (primarily through non-potable reuse, rainwater tanks, and low flow fittings), this was not achieved in operations. In fact, due to the cost and complexity of operating the recycled water treatment plant and dual reticulation system, the City of Gold Coast shut the scheme down in 2018, leaving the "purple pipes" to be supplied with potable water. Hence, while dual reticulation represents an excellent tool for educating the quality and value of recycled water as a resource, it is often unable to compete with the greater efficiency of other methods of recycled water utilisation (including agricultural, industrial or potable reuse).

Over-estimation of the amount of planned non-potable reuse which can be practically achieved in our local region (rather than reuse already being realised) appears to be limiting the estimated secure yield which can be achieved from purified recycled water. To this end, it is recommended that the secure yield of purified recycled water production be based on a practical view of the projected extent of non-potable reuse which can practically be achieved for each of the sources identified.

3.3 Advanced Water Treatment Plant Process Train

The AWTP process trains adopted for potable reuse applications around the world can generally be grouped into:

- 'membrane-based' (incorporating Reverse Osmosis (RO), and,
- 'non-membrane based' (incorporating ozone and activated carbon).

Well known examples of potable reuse schemes with membrane based processes include Orange County (California), Singapore's NEWater scheme, Western Corridor in Brisbane, and Perth's Groundwater Replenishment Scheme. Non-membrane based schemes are also common, albeit less widely known, and include Windhoek (Namibia),

The Water Reuse Investigation Report considered only membrane based process trains, which, when compared to non-membrane based processes, suffer from:

- A lower water yield (~80% for membrane based vs. ~97% for non-membrane based)
- Generation of a saline (and nutrient rich) brine stream which must be further treated and/or disposed of, and,
- Higher power consumption.

As non-membrane based process trains do not removal salts, they can only be used where the STP effluent is relatively low in salinity, or they can be blended into lower salinity surface waters. However, given the low hardness of the water generated from Nightcap STP, there is strong potential that one or more of the potential schemes (Lismore or Byron in particular) could meet these requirements. Should this be the case, the yield from these schemes may be some 15-20% higher than estimated.

3.4 Consideration of Growth in Wastewater (and Available effluent) Flows

The secure yield from IPR (IWCM Report, Figure 17) does not appear to have considered the growth in wastewater flows to sewage treatment plants (and the associated increase in effluent flows) over the project study period. If this is the case, then it underestimates the potential secure water yield from potable reuse by ignoring the scope to progressively increase the volume of water directed to reuse as the water demand in the region increases through to 2060.

4 ELECTRICITY CONSUMPTION AND OPERATING EXPENSES

The Flyover Virtual Landscape Model listed a power consumption of 6.5 kWh/kL for indirect potable reuse. This is much higher than typically reported for potable reuse schemes. For example:

- An AWTP based on a dual membrane treatment train (UF/RO) generally consumes around 1.5 kWh/kL of produced water.
- If advanced oxidation is added to the end of the process train (to ensure effective removal of contaminants such as 1,4-dioxane and NDMA), this would be expected to add approximately 0.5 kWh/kL at most (depending on log removal of contaminants required).
- Pumping to 80m head would consume around 0.3 kWh/kL, and,
- Lifting to 200m (from the existing Wilson River Source to Rocky Creek Dam) would consume around 0.8 kWh/kL.

Using these typical figures, the power consumption for the potential potable reuse schemes considered would be as follows:

- For a Ballina/Lennox scheme, production and return of purified recycled water to Emigrant Creek Dam would be in the order of 2.3 kWh/kL AWTP production.

- For a Byron scheme, production and return of purified recycled water to Emigrant Creek Dam would be in the order of 2.4 kWh/ kL AWTP production, and in the order of 3.1 kWh/ kL AWTP production for return to Rocky Creek Dam via the Wilson River Source.
- For a Lismore scheme, production and return of purified recycled water to Rocky Creek Dam would be in the order of 2.9 kWh/ kL AWTP production.

To estimate the power consumption per secure yield for these schemes, these figures would need to be divided by the fraction of the secure yield per unit volume produced from the AWTP.

It is also important to note that the power consumption of AWTPs based on non-membrane processes, where possible due to relatively low salinity ion the effluent source, will be substantially lower than indicated above.

Regardless, this rudimentary analysis suggests that the reported power consumption of 6.5 kWh/kL is likely to represent a large over-estimate, and misrepresents one of the key attributes of potable reuse as an option.

Similarly to the electricity consumption, no basis or detail has been provided for the operating expenses listed in the Flyover Virtual Landscape model has been provided in the supporting documents. Given the issues in the electricity consumption estimates, the relatively high operating cost reported for the potable reuse may be preventing proper assessment this supply alternative, and should be revisited in detail.

5 GREENHOUSE GAS EMISSIONS

Neither the IWCM Assessment of Augmentation Scenarios, Water Reuse Investigation Report nor the Flyover Virtual Landscape Model explore the greenhouse gas emissions which will be generated under each alternative. Under a transition to renewable energy sources for electricity supply, or dedicated renewable energy sources to offset black power consumption from an AWTP, the greenhouse gas emissions generated through potable reuse would be relatively minor, and potentially much lower than those from a new dam.

6 PROGRAMME FOR IMPLEMENTATION

The Flyover Virtual Landscape Model lists an implementation time of approximately nine years for the Dunoon Dam (which is currently the preferred option). This indicates that there is a suitable period of time available for implementation of potable reuse – provided the development of the scheme is not excessively delayed.

A number of potable reuse schemes in Australia, including Toowoomba, Gold Coast and Western Corridor, have suffered from rushed considerations or implementation targets. By contrast, some of the most successful potable reuse projects, including the Scottsdale (Arizona) project, and Perth's Groundwater Replenishment Scheme, have taken 8-10 years from commencement to completion. This underlines the observations that there is sufficient time to implement potable reuse in Rous County under the measured approach required to bring the community on the journey, but that a start of the development of the project should not be delayed by more than a year of two. RCC's proposal in regard to Perradenya is noted in this regard.

If the potable reuse journey is to be commenced, community engagement is critical. Under best practice, the majority of the implementation period for potable reuse is required not for engineering or construction - but rather to engage and educate the community on the potable reuse solution. To this end, it is recommended that Rous County Council consider a community engagement program beyond the current "Future Water Project" (if there isn't one in place already). The role of the Perradenya project (or a comparable demonstration project) should be considered in the engagement program. The "Water360' products available through WSAA, which were funded through the Australian Water Recycling Centre of Excellence (AWRCE), may also be a valuable resource for RCC to draw on in community engagement and education.

7 CAPITAL COSTS

The capital costs of potable reuse alternatives do not appear to have been considered in detail in any of the information presented. For example:

- Water Reuse Investigation Report – Appendix C includes a list of the costs for pipelines only, and presents no costs of the AWTP components of the works. Additionally, no build-up of the pipeline costs has been provided.
- The IWCM Assessment of Augmentation Scenarios report did not assess potable reuse, or present any costings of the potable reuse options.
- The Flyover Virtual Landscape Model indicated that potable reuse had the highest implementation cost of all the options considered (80-110,000 per ML of secure yield) – 4-5 times the cost of the Dunoon Dam options per megalitre of secure yield. This conclusion has not been supported by any costing information in the documents issued, and is at odds with the bulk water supply options assessments in other catchments which generally find potable reuse to be substantially more economical than desalination. IN the absence of additional information, it is not possible to ascertain if this may have been influenced by:
    - under-estimation of the available yield of potable reuse (see Section 3);
    - over-estimation of electricity consumption and other operating costs (see Section 4);
    - over-estimation of the capital cost for the schemes, or,
    - particular challenges (and expense) in implementing potable reuse in this region which have not been explained in the documents provided.

Additionally, unlike the Dunoon Dam option, potable reuse has scope to implemented progressively as demand and effluent flows grow over time. This enables the potable reuse alternative to be staged, thereby minimising upfront capital expenditure and operating costs.

8 REGULATORY FRAMEWORK

Media reports have indicated that Rous County Councillors have identified approval of a potable reuse scheme as a key barrier to its adoption. For example: "*Rous CC Chair Keith Williams is a supporter of recycled water in principle but says the NSW state government requires a successful precedent in the state with potable re-use water before a bigger scheme can proceed" (Byron Shire Echo July 27, 2020*). This is not in line with the advice being received from NSW Health by water professionals. Any potable reuse scheme in Australia must have the approval of the relevant state's Department of Health. In each case, the Department will be looking for the potable reuse proponent to show that it complies with the requirements of the *Australian Water Recycling Guidelines – Managing Health and Environmental Risks (Phase 2): Augmentation of Drinking Water Supplies (May 2008)* - particularly the 12 point risk assessment and management framework **and** the *Australian Drinking Water Guidelines 6 (2011).* Cognisance is also taken of the World Health Organisation's document, *Potable Reuse: Guidance for Producing Safe Drinking- Water (October 2017).*

NSW Health will be presenting on 'Guidance on Planning for PRW Schemes' at a virtual conference to be held on 3 December 2020, and RCC are urged to attend.

9 CONCLUSIONS

As a technical professional in the water industry, I strongly believe that potable reuse should be considered, along with water supply alternatives such as surface water, groundwater, demand management, stormwater and desalination, as a water source alternative on its own merits. This intent is consistent with Key Action 3 from RCC's adopted Future Water Strategy (2014). However, review of the Future Water Project documentation provided for public comment, and associated comments in the media, indicate that the assessment of potable reuse to date has not accurately represented the potential of this water supply option for this region, including:

- Failure to consider two significant sources of purified recycled water (Byron and Brunswick Valley STPs), and their potential transfer to Byron Creek (and Nightcap) or Emigrant Creek.
- Likely over-estimation of non-potable reuse which will be achieved by constituent councils.
- Assumption of membrane-based AWTP process trains throughout, where commonly used non-membrane based process trains, if viable, would increase water yield by 15-20% and reduce both power consumption and costs.
- Substantial overestimation of electricity consumption for potable reuse compared to existing schemes.
- Excellent fit of potable reuse to the currently available time for implementation.
- Unsupported and likely overestimated capital and operating costs for potable reuse.
- Identification of regulatory barriers to approval of potable reuse which are not consistent with current advice from NSW Health.

On this basis, I urge Rous County Council to progress investigation of potable reuse options for the region without delay, and allow this water supply alternative to be comprehensively evaluated against the alternatives based on accurate information.

Submission on the proposed Dunoon Dam within the Future Water Project 2060

From: Kathryn McConnochie
[redacted]
8th September 2020

To: Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager,
My family and I have lived in the [redacted] since 1985. The main reason that we chose to live in this area was because of the natural qualities of the local environment, specifically the flora and fauna. We are all deeply connected to the land in this area and feel strongly about protecting it. I personally have worked in Bush Regeneration for over 30 years and am also a qualified High School teacher. I have taught Environmental Education for many years in schools, Field Study Centres and for Councils. As part of my work in this area, I conducted water audits in schools. I gained valuable information on how to retrofit and to use water efficiently to prevent unnecessary usage and wastage of water.

I do not support the construction of the Channon- Dunoon Dam for the following reasons:

Environmental Damage from the Proposed Dam

Flora
The proposed site for the dam at the Channon Gorge, has an endangered ecological community of Lowland Rainforest on sandstone. (SMEC Australia: Terrestrial Ecology Impact Assessment, 2011). The Channon Gorge contains approximately 180 acres of lowland rainforest, that was documented in the previous survey of the area for the dam proposal in 2012-14. This type of rainforest is part of the Big Scrub Rainforest and 99 percent of the Big Scrub has previously been cleared. There is only 1 percent of the Big Scrub (approximately 940 ha) remaining. 55 hectares of this rainforest will be cleared if the dam goes ahead. It is vitally important as this area represents some of the largest blocks of Big Scrub remnants in existence. The remaining patches of The Big Scrub are extremely precious as the last remnants of this once huge rainforest. All efforts should be made to preserve every last piece of it, as it is the last vestige of a national ecological treasure.
In addition, 7 ha of the rainforest adjacent to Rocky Creek is growing on a sandstone base. This makes it doubly important, as this type of riparian warm temperate rainforest on sandstone is unique in NSW. However, the proposal is to clear almost all of this Endangered Ecological community, i.e. 6 ha. (Nan Nicholson, Rainforest Botanist, Echonet Daily 7/9/20). This is unconscionable destruction and is not acceptable by any standard, neither environmentally nor morally.

"ecologists have been excited by many rare plant species still thriving along his section of Rocky Creek, including large old river gums, pepperberry, hairy joint grass, white beech, red cedar, black wattle, bauple nut trees and kauri." (Jules Petroff, Echonet Daily, 10/8/20).

Fauna

Fish in Rocky Creek will be negatively impacted by a dam at this location. The loss of water flow will be detrimental to migratory fish which require the flow of the creek to complete their life cycles. For example, the Rainbow Fish and Archer Fish migrate up the creek from the ocean. The Eel-tailed Catfish also depends upon the flow of the creek and shallow water to lay their eggs on the sandy bottom. Rare fish species such as the Clarence River Cod, the Rainbow Fish and Australian Bass. These species could become extinct if the dam is built at this location. (Jules Petroff, Echonet Daily, 10/8/20).

There are platypus living in this section of the creek and they are also at risk if the dam goes ahead. Platypus need shallow creek water of 1-3 metres to forage in. They will not survive in the dam. Platypus are on the brink of extinction and are particularly threatened in NE NSW according to a recent study at UNSW. An ABC news article states that the study found the following:

Platypuses have been found dead in dried up creeks in NSW due to drought and human activity such as damming and water harvesting

https://www.abc.net.au/news/2020-01-20/platypus-on-the-brink-of-extinction-national-call-to action/11882584#:~:text=Key%20points%3A,of%20feral%20pests%20and%20livestock

The Lowland Rainforest in the Channon Gorge provides food and habitat for many species, including the iconic Koala, which has a healthy population located there and in surrounding areas. The proposed dam will cut an important Koala corridor in half. This will be extremely detrimental to the local communities of Koala and to the health of Koala communities in Northern NSW. (Nan Nicholson, Echonet Daily 7/9/20). Koalas are also under the threat of extinction, especially since the devastating bushfire season of 2019 – 2020:

Koalas are on track to face extinction in NSW as early as 2050 based on current trends and expert knowledge, without a significant reduction in tree clearing, mitigation of climate change and major expansion of protected areas.

https://www.wwf.org.au/ArticleDocuments/351/pub-Koala-extinction-risk-NSW-28sept18.pdf.aspx#:~:text=Koalas%20are%20on%20track%20to,major%20expansion%20of%20protected%20areas.

There are many bird species dependent on the riparian rainforest in the Channon Gorge and many of these species are regionally significant. Other important resident species are a rare legless skink and turtles. (Jules Petroff, Echonet Daily, 10/8/20). There has not been a thorough assessment of the threatened species within the gorge. This must be carried out as an urgent priority before any consideration of a dam is made.

We must do everything possible to protect the habitat of these threatened and regionally significant species listed above. They are the very few that have survived the mass clearing of the Big Scrub Rainforest and it is our responsibility to preserve them, if not for their own

sake, then for the future generations to enjoy and most importantly for the health of our regional biodiversity.

Destruction of important Indigenous cultural heritage

There are aboriginal artefacts and burial sites within the gorge which must be preserved. (Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011)
If the dam proceeds it demonstrates ongoing disregard for First Nations' heritage. Does Rous Council want to be held responsible for their destruction?

The 21st century is about a suite of smart water options

This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive project. The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently. It would represent a lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government)
https://www.dropbox.com/s/pu9898oq6kocrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

Providing water for an increased population

The small population increase predicted for the four Rous-supplied councils of 12,720 between 2020-2060 does not justify such a large and destructive dam.
The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".

Higher prices for consumers

Due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built. This an unacceptable increase for water costs. Rates in the Byron Shire are the highest on the North Coast & further increases for water are unsustainable for a large proportion of the population.

Negative Impacts on the Channon Community

The Channon/Dunoon community would become an Industrial/construction zone for the two and a half years of dam construction. There would be noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
Further to that, when the dam is completed there is the potential for catastrophic flooding downstream in the worst floods, particularly for the first 3 kilometres below the dam. (Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, Eco Logical Australia).

I support these alternatives:

System Wide Water Efficiency, as per Professor Stuart White's Review of Rous Water supply augmentation proposal:
https://drive.google.com/file/d/1knun42rhXOPuOgImBz-VTunMQ3l-fiu7/view
and https://drive.google.com/file/d/1F9WYqZ4IuyxMIjp9iJIIhl5oAhaUK5OM/view

System Wide Water Efficiency needs to be analysed and costed by Rous Council & these figures must be made available to the public.

Water re-use in various ways, including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as
set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?
https://www.waterra.com.au/publications/document-search/?download=1806

Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.
This builds community resilience - much needed, as the recent extreme bushfire season has shown.

The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."

Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.
https://www.yourhome.gov.au/water/rainwater

Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.

https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown

Conclusion
For all of the reasons I have outlined above, I strongly object to the construction of the Dunoon dam. The environmental, cultural & social consequences are far too high and I consider them to be totally unacceptable.

There are other alternatives which can provide adequate water for the region, as outlined above. The System Wide Water Efficiency methods must be researched and implemented before the construction of another dam is considered.

Feedback Submission Re: Proposed Dunoon Dam within the Future Water Project 2060

To: General Manager, Rous County Council
PO Box 230, Lismore NSW 2480

From: David Ellemor-Collins

Address: [redacted]

Firstly, the community appreciates the submission extension. We also acknowledge the complexity of the work Rous does to provide water for our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Lost opportunity to invest in system-wide water efficiency**. This is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption.[1]
- **The 21st century is about a suite of smart water options.** This dam would be a lost opportunity to make our system fit for the 21st century by swallowing all resources in one big expensive 'white dinosaur' project.
- **The dam would encourage continued inefficient and wasteful water management by local governments.** They would have no incentive to do things differently.
- **Destruction of important Indigenous cultural heritage,** including burial sites.[2]
- **Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest**, threatened flora and fauna species.[3] Rous's plan to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone is problematic as the type of vegetation offered as recompense is not equivalent.(Nan Nicholson, botanist) Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."[4] Rous is required to ***avoid*** this destruction because there are economically viable and more effective solutions.
- **Industrial/construction zone** for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.
- **Higher prices for consumers due to a 4x increase in the cost of water.** Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.
- **The small population increase** predicted for the four Rous-supplied councils of 12,720[5] between 2020-2060 **does not justify** such a large and destructive dam. The dam risks diverting expenditure away from more sustainable, flexible and effective solutions.[5]

I SUPPORT these alternatives:

We need a suite of smart water options and proven alternatives, not a huge new dam. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet our water needs too.

- **An investment in system-wide water efficiency and strong demand management.** Analysed, costed and deployed, creating jobs. *(We understand Rous has not costed this in creating their future water plan)* Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.[6][7]

- **Water re-use in various ways, including Purified Recycled Potable water.** A wealth of global research and experience exists regarding potable reuse of water.[8] Eg: The city of Windhoek in Namibia has been using purified recycled water for 30 years using advanced technology.[9]
- **Water harvesting** (urban runoff; rain tanks):
  Water tanks on all new (and existing) developments.The Australian government advises that: "Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs."[10] Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.[11]
- **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.
- **Groundwater, where this is environmentally safe.** The Australian government provides a lot of information on the ecological impacts and groundwater usage.[12]

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

References and Notes

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc https://www.dropbox.com/s/pu9898oc6kccrph/NSW%20Govt%202006%20MWP%20summary.pdf?dl=0
(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011
(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011
(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan > , Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.
(5) NSW Department of Planning, Industry and Environment 2019, *'NSW population projections* ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> Scroll down to "Local Government Factsheets".
(6) The Rous Regional Water Efficiency Program 1997, *Final report of the Rous Regional Demand Management Strategy : preferred options*, Rous County Council, Lismore.
(7) Watson R., Turner A and Fane S 2018, *Water Efficiency and Demand Management Opportunities for Hunter Water*, Institute for Sustainable Futures, Sydney.
(8) Kahn,Stuart and Branch, Amos 2019, *Potable water reuse: What can Australia learn from global experience?*, Water Research Australia Limited, Adelaide.
(9) Windhoek Goreangab Operating Company (Pty) Ltd 2020, *Our history | Wingoc*, Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>
(10) $220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area based on 194L/person/day average water use (Rous).
(11) Australian Government Department of Industry 2013, Science, Energy and Resources, *Rainwater | Your home*, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>
(12) Department of Agriculture, Water and the Environment 2018, *What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment*, Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

Kind regards, Signature: [redacted] Date: 9/9/20

At this point it is clear: we need to be protecting and extending forests, not destroying them. There are effective alternatives to a large dam: please pursue those alternatives.

Roslyn Irwin
[redacted]

Phillip Rudd
General Manager
Rous County Council
[redacted]

Submission re proposed Dunoon Dam within the Future Water Project 2060

I was a Lismore Council representative on Rous County Council from 1991 t0 1999 and served as Chair from 1997 to 1999. It was during this time that the Council introduced its first water efficiency measures such as funding water efficient shower heads and dual flush toilets for its water consumers. These and other demand reduction measures were supported by appropriate public promotion, and the response from Rous water consumers demonstrated that, when given the opportunity and an incentive to become involved in reducing the demand for water they were prepared to do so.

Whilst at that time Rous identified an area for a potential future dam below Rocky Creek dam, Councillors understood that Rous would continue to implement water efficiency measures, including potable reuse of waste-water, as part of its assessment of whether the dam was viable. Those and other alternative measures would increase with improved knowledge, technology, successful implementation elsewhere, changing climate conditions and public understanding of the need to reduce the demand for water across the constituent Council areas. These would reduce, if not eliminate, both the need for the dam and its huge financial cost, estimated as four times more than the current cost, to water consumers. However, it seems that Rous is seeking approval of the dam without fully considering all viable alternatives already implemented successfully in other places.

Apart from the estimated cost of $150m, the economic and environmental impacts of the dam, if it proceeds as proposed, are so significant that the Council would be wise to call a halt to planning for the dam unless and until those impacts can be mitigated or offset. In their *Dunoon Dam Terrestrial Ecology Impact Assessment 2011,* SMEC identifies the size of those impacts and the flora and fauna that will be affected. The proposed dam will 'destroy 272 ha of vegetation of which 57 ha is predominantly native accounting for 92% of Warm Temperate Rainforest, 50% of Subtropical Rainforest, 34ha of lowland Rainforest, which is listed as a threatened species (EEC), 40% of Tallowwood Open Forest and 30% of Flooded Gum-Tallowwood-Brush Box Open Forest within the area.'

This vegetation is important in its own right and should be retained unless removal is unavoidable. However, it is also important as it has habitat features and linkages for 17 fauna species listed as threatened in NSW including the koala, which is currently listed as vulnerable, and also for a wide range of other fauna and flora species. As SMEC has stated, 'pathways for koalas would be impeded from the installation of the dam wall, spillway, and the inundation area' (p.i). As a volunteer with Friends of the Koala over 9 years, one of the lessons learnt was that the underlying factor in most koala deaths is diseases such as chlamydia and retrovirus caused by the stress koalas experience when their habitat is removed e.g. 74% of the 330 koala deaths in the region last year were due to disease. Their situation is precarious in 'normal' times and the 2018-2019 drought followed by the 2019/2020 bushfires caused devastation in the Region and resulted in the death of at least 2000 koalas in the Richmond Valley and Ballina LGAs. If they, and other fauna that share their habitat, are to be saved from extinction, we need to make sure their habitat is protected. Whilst I can comment on koalas, the impact on the other 16 threatened fauna would be similar. SMEC concluded that 'the long-term viability of threatened fauna populations within the study area could be compromised from the works, the barrier effects of the proposed infrastructure and inundation area, and the loss of threatened fauna habitat and habitat features as a result of the proposed dam. Potentially significant impacts are likely for a

number of threatened fauna species that utilise the study area and the habitat it provides. (p. xiii, APPENDIX 7 PART 3A THRESHOLDS). SMEC recommended that if the project were to continue 'a Species Impact Statement would be required.' I was unable to find such a document.

SMEC identified measures that could mitigate the significant impact on threatened flora and fauna species, but even if they were all implemented SMEC says that there are certain impacts that will still occur.

One of the other impacts this dam would deliver is the destruction of significant First Nations cultural heritage sites including a burial site of 15 burials. I understand that Ainsworth Heritage in their *Cultural Heritage Impact Assessment for Rous Water* of 6 December 2011 (p.11) said that 'if it is not possible to disturb or inundate the burial sites Rous Water would need to abandon the Dunoon Dam project from further consideration as a future water source.' I also understand that Ainsworth Heritage recommended further actions including more consultation with the local Aboriginal community. I am unaware of whether the recommendations were followed and if so, any outcomes, however my personal opinion in regard to any disturbance or inundation of what are sacred sites is that, unless agreed to by the First Nations people, the advice by Ainsworth Heritage should be followed.

I have read the August 2020 *review of Rous Water supply augmentation* by Professor Stuart White of Sustainable Futures at the University of Technology, Sydney. His experience with Rous Water and my knowledge of his experience in water issues dates from the 1990s when he was contracted by Rous County Council to assess and report on the Council's Regional Water Efficiency Program. I consider him to be an expert in his field and support his conclusion that the need for this dam has not been justified. I also support his recommendation for Rous to implement a large-scale water efficiency program, not only because it is a cost-effective measure but also because it would have other significant benefits for the Region and would educate water consumers on how they can reduce their own use of water.

To summarise my position in regard to the proposed dam, I believe that, given the huge cost to water users, and the significant impacts on threatened flora and fauna species and First Nation cultural sites, this project should not proceed unless and until the benefits of implementing a large-scale water efficiency program have been fully assessed and costed. If the Council then determined to proceed with the dam it would need to demonstrate to the community what steps it would take to mitigate the known impacts such a dam would deliver.

Dr. Roslyn Irwin
9 September 2020

From: Thomas Driftwood

9th September 2020

To: Rous County Council and the Rous Councillors,

Re: The proposed Dunoon Dam within the Future Water Project 2060

Photo David Lowe. The Channon Gorge. This would be flooded if the proposed dam goes ahead.

Dear Rous Councillors and General Manager,

Re: The proposed Dunoon Dam within the Future Water Project 2060

Firstly, thankyou for supporting the extension of the submission date – much needed and appreciated.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

- **Higher prices for consumers due to a 4x increase** in the cost of water. In response to a question from councillor Vanessa Ekins, Mr Rudd said he expected a fourfold

increase in the cost of supplying water if the dam is built. [Phil Rudd, Rous general manager]

● The **small population increase** predicted for the four Rous-supplied councils of 12,720 (5) between 2020-2060 **does not justify such a large and destructive dam**. The dam risks being an **expensive white dinosaur**, diverting expenditure away from more sustainable, flexible and cost effective solutions.

NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections> scroll down to "Local Government Factsheets".(5)

● **Lost opportunity to invest in system-wide water efficiency –** this is the **cheapest** & **fastest** way to ensure we all have enough water. By focusing on system efficiency, Sydney added an additional 950,000 people without a rise in water consumption for 25 years. (Metropolitan Water Plan 2006, NSW Government) (1)

● The **21st century is about a suite of smart water options**. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive and risky 'white dinosaur' project.

● The **dam would encourage continued inefficient and often wasteful water management** by local governments. They would have no incentive to do things better.

● **Destruction of beautiful Whian Whian Gorge**, the second largest remnant of the 99% cleared Gondwanna Sub-Tropical Rainforest. At more than 60ha this represents over 10% of this precious habitat and is 40% the size of the World Heritage recognised Big Scrub Flora Reserve to which it connects geographically, 7kms downstream from the Rocky Creek Dam.

● **Destruction of beautiful The Channon Gorge** and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species.

[Terrestrial Ecology Impact Assessment, 2011]

Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone.

"'Offsetting' with similar plantings is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most." [Nan Nicholson, botanist]

Councils are required under State planning regulations to:

1. "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value."

[NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03August2020 https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan],

2. Enhance biodiversity coastal and aquatic habitats and water catchments. (4)Rous is required to avoid this destruction because there are economically viable and more effective solutions.

● **Catastrophic flooding downstream** in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)(6).

● **Flooding of half of the popular Whian Whian Falls recreational area**. This involves Aboriginal women's ceremonial pools, and in high rainfall periods would make the main Falls unusable.

● **Accelerate extinction of a multitude of vulnerable species**. Extinction level pressures on 3 vulnerable fish species due to destruction of 6kms and genetic islanding of over 18kms of migratory native fish habitat. Extinction pressure on 19 threatened plant species, and 24 threatened fauna species. [As recorded within the 2011 Rous Ecological Surveys].

● **Koala habitat and important "corridors"** connecting Whian Whian, Dunoon and The Channon populations would be reduced.

● **Geotechnical considerations**: basalt soil landslides and sandstone leakage with potential dam failure & massive cost blowouts. [Interview with Michael Mackenzie, Rous Engineer on 20.08.20]

● **Destruction of important Indigenous cultural heritage**, including burial sites (Cultural Heritage Impact Assessment, 2011) (2). Ongoing disregard for First Nations' heritage.

I SUPPORT these alternatives:

I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable resource use. It is time for the tide to turn on how we meet our water needs too. This is 21st century thinking.

● An **investment in system-wide water efficiency and strong demand management**. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan). Existing research over the past decade consistently finds that the best value for money investment in water supply comes from demand management and identifying savings within the existing supply. (7) (8)

● **Water reuse** in various ways, including Purified Recycled Potable water. A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806 (9)
Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history (10)

● **Water harvesting via urban runoff & rainwater tanks**: Water tanks on all new (and existing) developments. Remove the rubbish law that prevents urban use of rainwater in the Ballina Shire. (11) This builds much needed community resilience, as the recent extreme bushfire season has shown. The cost of a 22,000L rainwater tank is only $2,500. If this were spread over each new 2 person household (est 13,000 pop by 2060) the cost would be a mere $16 million, and combined with automatic-mains top-up, can provide 100% reduction in mains water use!
The Australian government advises that: “Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs.” Rainwater harvesting also decreases storm water runoff, thereby helping to reduce local flooding and scouring of creeks. (12)
https://www.yourhome.gov.au/water/rainwater

● **Deep underground water storage with surface runoff integration**
[https://www.abc.net.au/news/2020-03-04/water-banking-aquifers-australia-facing-future-drought/12009702] [Dillon, P, Stuyfzand, P, Grischek, T et al 2019, 'Sixty years of global progress in managed aquifer recharge', Hydrogeology Journal, vol. 27, no. 1, pp. 1-30 [Ross, A 2017, 'Speeding the transition towards integrated groundwater and surface water management in Australia', Journal of Hydrology, vol. Article in press.]

● **Contingency planning** would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought. Multiple sources of water rather than putting all our "eggs in one basket" (ie: million$), allows us to route around any points of failure in the water system.

● **Groundwater**, where this is environmentally safe The Australian government provides a lot of information on the ecological impacts and groundwater usage. (13) The Regional Investment Corporation (RIC) which administers the National Water Infrastructure Loan Facility allow up to 49% lending towards: groundwater and managed aquifer recharge supply schemes and water treatment, including desalination, storage and reuse. [https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown]

With scalable supply alternatives in place, the **existing supply** from Rocky Ck Dam will be made **resilient** to anticipated times of drought and projected population growth, **without** the environmental destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

For a picture journey through part of this incredible landscape please see **David Lowe’s amazing photography of the threatened Channon Gorge**:

https://www.flickr.com/photos/davidlowe1970/albums/72157715831462108?fbclid=IwAR3nK782KFszAMwn_74HKC02f-BsGKbYCZmwyWg0GYrSAGmaU0UHZCaqKgo

Kind regards,

Thomas Driftwood

Photo David Lowe

References and Notes:

(1) Metropolitan Water Plan 2006, NSW Government. Exec Summary section of the doc. https://www.dropbox.com/s/pu9898oq6kocrph/

NSW%20Govt%202006%20MWP%20summary.pdf?dl=0

(2) Ainsworth Heritage, Cultural Heritage Impact Assessment, 2011

(3) SMEC Australia, Terrestrial Ecology Impact Assessment, 2011

(4) NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.

(5) NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, https://www.planning.nsw.gov.au/ Research-and-Demography/Population-projections/Projections Scroll down to "Local Government Factsheets".

(6) Environmental Flows Assessment Proposed Dunoon Dam, 30 Aug 2012, EcoLogical Australia.

(7) The Rous Regional Water Efficiency Program 1997, Final report of the Rous Regional Demand Management Strategy: preferred options, Rous County Council, Lismore.

(8) Watson R., Turner A and Fane S 2018, Water Efficiency and Demand Management Opportunities for Hunter Water, Institute for Sustainable Futures, Sydney.

(9) Kahn, Stuart and Branch, Amos 2019, Potable water reuse: What can Australia learn from global experience?, Water Research Australia Limited, Adelaide.

(10)Windhoek Goreangab Operating Company (Pty) Ltd 2020,Our history | Wingoc, Veolia Environment, Windhoek, viewed 3 August 2020, <https://www.wingoc.com.na/>

(11) $220 million dollars - the estimated cost of the new dam - could provide more than 73,000 rainwater tanks (22,700L) at $3,000 each including installation. That is 1.66GL storage with no evaporation and much increased community resilience for future climate risks. This more than covers the 0.9GL extra water needed by the 12,720 new people predicted to come to our area, based on 194L/person/day average water use (Rous).

(12) Australian Government Department of Industry 2013, Science, Energy and Resources, Rainwater | Your home, Canberra, viewed 3 August 2020, <https://www.yourhome.gov.au/water/rainwater>

(13) Department of Agriculture, Water and the Environment 2018, What are the ecological impacts of groundwater drawdown? | Department of Agriculture, Water and the Environment, Canberra, viewed 6 August 2020, <https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-groundwater-drawdown>

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THE GREENS

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Tamara Smith MP
Member for Ballina
[redacted]

7 September 2020

Submission – Future Water Project 2060

Dear Rous Councillors and General Manager

Thank you for the opportunity to make a submission on Rous County Council's proposed Future Water Project 2060. I am particularly grateful for the extension of time that was granted to the community to make submissions.

I want to commend Rous on the reports that were sought and delivered as information to the community through this engagement process as they are incredibly detailed and easy to read.

Overview

We know that water security and water scarcity will be some of the biggest challenges facing our communities on a warming planet. I commend Rous for thinking of the future and well beyond any election cycle – this is heartening both in a practical sense but it restores my faith in elected representatives and the staff that support them, in that this kind of future-proof planning is what the community and planet desperately need us to do.

We need to make sure that all of our supply yield modelling is based on at least 1.5 Degrees Celsius of global warming to 2030 and given that this report extends to 2060 you should consider modelling based on 2 degrees of warming. Your reports are premised on a 1 Degree Celsius of global warming and according to the IPCC in 2020 that is a major under-estimation.

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The de-salination proposal is an excellent one and accompanied by water saving technologies, at the home water generation, current water supplies and the upgrade of the Marom WTP we do not need to go down the path of an expensive new dam that is not fit for a warmer planet and will destroy precious Aboriginal heritage, wildlife and biodiversity.

Dams are an outdated way to think about water yields on a warming planet. I encourage Rous to look at what they can do to incentivise people to manage potable water at their property sites as has been done in Sydney and all over the world.

The demand for water is likely to be far higher than that predicted by these reports due to higher than 1 degree Celsius in global warming. This means we need an array of measures to cover every contingency. The cost of the proposed dam at $220 million total initial capital cost and over $400 million in maintenance and operating costs over 80 years does nothing to insure us for a future of dwindling annual rainfall, longer and longer droughts and less and less day to day topographic rainfall in our region. Whereas, moving towards one and perhaps several desalination plants in the next 40 years covers every contingency. Particularly, if the community is educated that we are moving from creeks and dams for drinking water to reverse osmosis from sea water on a warming planet.

Climate Change

I am concerned that there is not much detail on the impacts of climate change in either the assessment of groundwater extraction in Jacobs, *Future Water Strategy: Groundwater Schemes and Whole of Life Cycle Costings,* or figures in the *Rous Regional Supply: Future Water Project 2060, Integrated Water cycle Management Development: Assessment of Augmentation Scenarios.*

The projection of only 1 Degrees Celsius of global warming in the report scenarios and an uncertain timeframe for reaching that level of warming is a major concern and I believe risks all of the data sets outlined in your work.

According to the Intergovernmental Panel on Climate Change report, *Understanding Global Warming of 1.5 degrees Celsius* published in 2019, global warming is likely to reach 1.5 degrees Celsius between 2030 and 2052 if it continues to increase at the current rate.

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On page 11 of the *Rous Regional Supply: Future Water Project 2060, Integrated Water cycle Management Development: Assessment of Augmentation Scenarios* report, the author acknowledges that:

> *Determining the impact of climate change on the secure yield of a water supply system involves two modelling steps:*
>
> - *modification of daily rainfall and evapotranspiration data and calibrated rainfall-runoff models to produce climate changed daily stream flows, and*
> - *the daily climate changed streamflow, rainfall and evapotranspiration are input into the water supply system simulation models to determine climate changed secure yields.*

The report takes as its basis the same scientific logic of the CSIRO's Murray Darling Basin Sustainable Yields Project which used daily historical data from 1895 to 2006 – a period during which global warming was on a less step trajectory.

The report goes on to state that their projections have relied on the assumption that secure yields are premised on 1 degree of climate warming to represent the available water supply in 2030. Given IPCC projections this seems to be a fundamental underestimation of global warming and hence brings into question the accuracy of the data around supply yields.

Action: Rous to get additional data based on at least 1.5 degrees Celsius global warming and preferably 2 degrees.

Dunoon Dam Proposal

Dams on a warming planet are becoming increasingly ill-equipped to deal with potable drinking water demand – primarily because we as a society are using a precious resource for household purposes that simply are not warranted. Why do we use best quality drinking water for all of our household needs instead of only using potable water for drinking?

On average, each person in Sydney uses about 200 litres of water a day. Sydney Water says that, of that 200 litres, 26% is showers; 23% outdoors; 20% toilets; 12% washing clothes; 12% inside taps; 6% bathtubs and 1% for dishwashers.

Were Rous to supply the 12% that must be potable then 88% of Rous's supply could be non-potable. With a bold education programme, we could wean ourselves off drinking shower and

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bath water as well (total 32%). Even without that change, a total of 55% of daily use (outdoor + toilets + washing clothes) should not be potable.

Were Rous to supply just that 45% of its current and future estimates of 'demand', its current supply would be adequate for many decades beyond 2060.

Ballina Shire Council is already leading the way, with dual reticulation in new subdivisions and with supplying suitably treated water. It also has access to alternative existing sources (Marom Creek, Alstonville Plateau). Byron Shire Council supplies locally procured water to Mullumbimby, though without a significant storage - an off-creek storage could be added to boost security of that source. Richmond Valley Council's area includes the Woodburn groundwater source. While that may not yield potable water, treatment for non-potable use is not as complex as for potable.

A key problem lies in the high cost to date of supplying non-potable water compared with that from Rous sources. For future development, Rous Water could support urban water users managing their own supplies (as do rural users) either singly or collectively via a variety of methods including: roof-water tanks; stormwater harvesting and recycled water for non-potable uses.

Sydney Water gained approval from IPART this year to vary its 'usage' price according to the level of Warragamba Dam. This sends a clear virtue signal and price signal to households to start saving and recycling water at their residence. Why isn't Rous looking at working further with Councils to subsidise water tanks and water recycling for people on low incomes and then charging a premium for potable water. So many of our villages are not connected to town water and already pay for water so that in itself incentivises those households. Why aren't we looking at education and more at-the-home water saving and water recycling technologies.

Action: I do not support the proposed Dunoon Dam.

Water Mining

Jacobs *Future Water Strategy: Groundwater Schemes and Whole of Life Cycle Costings Report B* explores water mining/ groundwater sources as an option to secure water for the future. It looks at new and very large bores at Woodburn, Newrybar, Tyagarah and Alstonville. It should be noted that each of these locations is prime agricultural land and are basically our food belt.

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Greens NSW do not support water mining and there is no social license for water mining in the Northern Rivers. We saw this in the Alstonville Plateau in 2018 and 2019 where farmers started to report that their groundwater levels were very low through the drought and when they raised serious concerns about extracting licenses for commercial use.

Whilst the Chief Scientist of NSW argues that there is endless groundwater that is not the lived experience of farmers in our region and the precautionary principles tells us that further large-scale extraction is unwise. Water for NSW has done no rigorous scientific investigation of groundwater levels in the Norther Rivers in the last decade. Only desk top studies that are devoid of likely climate change scenarios are relied upon and quite frankly why we would risk our food growing water.

There is plenty of evidence in the United States where water mining near the coastline has resulted in higher and higher salinity levels in the groundwater. Farmers can't grow food with salt water and cows can't drink salt water! It is interesting to read the predicted brackish water quality from the prosed new bores. Each bore water yield requires reverse osmosis to provide drinking water to the community. Why would you risk our food growing water when a desalination plant can use sea water with no risk to food or folk?

Action: I do not support the proposed groundwater bores proposed in this report.

Rous County Council Desalination Investigation

The *Ganden* report is a very detailed 195 page report that explores the feasibility of desalination sites in 3 locations; Byron Bay, South Ballina, and Lennox Head. They have only considered a, "single relatively large-scale facility" as opposed to two or multiple facilities. It is the view of the report that multiple facilities are not considered economically or socially viable and I agree with their assessment at this stage and until new technologies emerge.

The report proposes a single plant location in Byron Bay located on the parcel of land adjacent to the existing Sewerage Treatment Plant (STP) for a number of reasons that I am persuaded by.

The Report makes it clear that the cost of a desalination plant is significant and that a facility can only be justified from an economic sense when operated at a close to full capacity at all times. This suggests that if we as a community opt for that capital expenditure and investment that Rous will need to work on educating the community that this is the way of the future and is best for people and the planet.

Critics of desalination plants argue that they are a very expensive capital investment in the short term and that they are only utilised as a last resort when water runs out. Interestingly, in the last 2 years we have

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seen the Adelaide desalination plant, that is currently being expanded to double its capacity, turned on to save water from the Murray-Darling Basin and the Sydney desalination plant, that is also being expanded to double its capacity, turned on in response to the last drought.

On a warming planet and IPCC predictions of greater than a 1.5 degree Celsius temperature rise, desalination plants are going to truly stand the test of time no matter the scenario. I have had informal conversation with the NSW Water Minister and the NSW Water Commissioner as well as other key water experts in government and they all agree that desalination is the way of the future and that we just need to get past the emotional response of communities drinking what was once sea water.

I fully support the construction of a 10MLD Seawater Reverse Osmosis (SWRO) Plant with an offshore intake and outfall. I also support the idea of a staged construction with an initial 5MLD plant, followed by incremental increases of 2.5 MLD to achieve the ultimate 10MLD plant capacity.

Given the shortfall in terms of climate modelling that underpins these reports the Desalination Plant proposal stands out to me as the best scenario to support our communities to 2060.

According to the yield benefit table in your report the 50 GL Dunoon Dam with 15,057 ML/a looks to be a great option compared to the 10 ml/D Desalination plant with only 1,550 ML/a water yields. However, given that the entire underpinning of the figures in these reports relies on only 1 degree Celsius warming over the next 40 years! I would argue that this is not a risk worth taking.

The combination of at-resident-site water saving and water generating capacities, the upgrade of the Marom Creek WTP and the current predicted flows from our current water sources coupled with a desalination plant in Byron Bay, prepares us for any future contingencies in terms of drought.

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I would think that we will need several desalination plants in the Northern Rivers before 2060 if we as a species continue on our current trajectory of carbon emissions.

Action: I fully support the construction of a 10MLD Seawater Reverse Osmosis (SWRO) Plant with an offshore intake and outfall.

Thank you for this opportunity and I look forward to seeing where the submissions take you.

Warm regards

Tamara Smith MP
Member for Ballina

Tanja Krebs-Nelson
[redacted]

9th September 2020

Dear Rous Councillors and General Manager

Re: The proposed Dunoon Dam within the Future Water Project 2060

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

1) The destruction of culturally significant indigenous sites, including burial sites and scar trees.

2) The dam would destroy The Channon gorge and its endangered flora and fauna. Of special note is the rainforest on sandstone within the proposed dam site – this is very rare and needs protecting.

3) Higher cost of water for consumers to pay for the building of the dam.

4) The option to invest in a system-wide water audit has not been investigated.

5) Potential for severe flooding downstream during severe storm events.

I DO support:

1) Ground water use where environmentally sustainable.

2) Water audit and system-wide water efficiency program across the county, as advocated by Professor Stuart White.

3) Incentivising the use of shower timers. At our current address we are solely dependent on tank water. We have fixed timers that shut off the showers and it has helped enormously to curtail water use. We use an Australian made product called Shower Timers Australia.

   This product could also be made mandatory in all hotels, motels, backpackers, hostels, air bnbs, holiday rentals, etc which would help to safe millions of litres each year.

4) Strongly advocate for the use of recycled drinking water with the NSW government. This would free up a huge amount of waste water that is literally going to waste.

I trust that Rous County Council will take my concerns into consideration on this matter.

Sincerely
Tanja Krebs-Nelson

Clarence Valley Conservation Coalition inc

[redacted]

9th September 2020

The General Manager
Rous County Council
Po Box 230
LISMORE NSW 2480

Email: council@rous.nsw.gov.au

Submission opposing the proposed Dunoon Dam

The Clarence Valley Conservation Coalition (CVCC) is a community group which, since its formation in 1988, has been involved with environmental issues – both locally and further afield. Two of the major interests of the CVCC since its formation have been water issues and biodiversity protection.

This submission briefly discusses biodiversity and water supply in relation to the Future Water Project 2060.

Dunoon Dam and Biodiversity

While acknowledging that Rouse Water's Future Project 2060 does not directly affect CVCC members, we have some serious concerns about the impact this proposal will have on biodiversity.

The Channon Gorge contains an endangered ecological community - an important remnant of the Big Scrub lowland rainforest which is now only 1% of its former size. Rainforest botanist Nan Nicholson said that about 55 ha of rainforest would be cleared for the dam. This is about 5% of the remaining Big Scrub. She said, "It might not sound much, but actually it's incredibly critical, particularly because it's in two large blocks, and most of the Big Scrub remnants are just tiny little patches."[1]

The CVCC understands that the Channon is a known hotspot for koalas and that the existing corridors they use will be cut by the Channon dam. With many of the region's koalas killed in the severe 2019-20 bushfires and koala habitat extensively damaged by fire and logging,

[1] https://www.echo.net.au/2020/09/nan-nicholson-and-annie-kia-share-dam-concerns/

this development would add to the habitat stress affecting koalas. All of these cumulative effects are likely to hasten the species' slide towards extinction.

The natural world in our region has been placed under increasingly severe stress in recent years. The CVCC believes that we cannot afford to continue on the current path where important ecosystems are destroyed and native fauna are pushed towards extinction. While supporters of the Water Project 2060 may argue that the proposal affects only a relatively small area, this view does not take into account the cumulative effect that this and other developments have on the natural world. It is not in humanity's long term interest to accede to the continuing degradation of the natural world as we all depend on the ecological services that the natural world provides humans and other life forms.

Water supply

There are a range of questions about the assumptions used to justify construction of the Dunoon dam. The relatively small predicted population increase from 2020-2060 does not justify the building of a large, expensive and damaging dam. Furthermore alternatives such as a suite of measures to improve water efficiency and demand management have not been properly considered as an alternative.

According to Professor Stuart White of the Institute for Sustainable Future (UTS), the need for the dam "has not been demonstrated by the available data and analysis". He said, "Amongst other concerns, committing to the construction of the Dunoon Dam option would represent a significant financial risk, and further, would waste an opportunity to demonstrate leadership in sustainable water management and to provide timely support for economic development and employment in the region."[2]

The Clarence Valley Conservation Coalition urges Rouse Water to abandon its plans for the dam and instead adopt more sustainable measures to secure its water supply into the future.

Leonie Blain
Hon Secretary

[2] Prof Stuart White – Brief Review -Rous Water Augmentation 20200904.pdf

[redacted]
8 September, 2020

Dear Rous Councillors and General Manager,

Re: The Proposed Dunoon Dam within the Future Water Project 2020

Dear Sirs and Mesdames,

Having had our water cut for just six hours yesterday for maintenance and repairs, it brought into sharp focus what an essential service you, Rous Water, provide. Luckily, I was also able to fall back on the water that we provide for ourselves with our own water tanks and our careful use of this precious resource. It reminded me that we all have a role to play in creating and safeguarding our water supply into the future. Multiply this by the hundreds of thousands of households throughout the region (along with other water harvesting methods), and I fail to see the need for this great big new dam.

I'm shocked to find that such a proposal is even being considered in this day and age.

Surely the large scale destruction of the environment, along with First Nations' Heritage sites just isn't how we go about things any more. There is just too much at stake and too little to be gained from it.

On Father's Day, my partner and I along with the children and grandchildren, drove through this magnificent countryside. His sons had wanted to honour the fact that forty one years ago my partner was one of the many people who fought to save Terania Creek. It was raining. Even so there were at least 50 people who visited in the time we were there, so precious and valued is this small remnant of glorious rainforest. It demonstrated to me just how much people must value what was saved to venture there in such weather. It is a proper rainforest.

The rainforest you have earmarked for destruction happens to be unique and rare in that it stands on sandstone.

I read that you plan to 'offset' this loss by regenerating degraded land elsewhere. Now you and I both know this is spin. (I live in Ocean Shores and we had land that was handed over to the RTA 'offset' – it's a joke. It is an insult and it is no compensation at all. It is useless.

Nan Nicholson who knows the area under threat, who lives in the area, who has documented, published and is a highly recognised and respected expert in the rainforest flora of the whole East Coast, let alone this region, says, that what is being offered as 'offset' is in no way equivalent to what will be lost. Indeed she says it is a worse example than most 'offsets'. On this I will listen to Nan. And so should you. She is the expert.

Have you invited experts like Nan Nicholson to the table to discuss the impact of your proposal? The experts in local flora and fauna? The elders? I would be more open to what you propose if these 'earth carers' who have both the interest of the people and the planet at heart, were asked to be a part of the solution.

And I'd like you to know that I consider myself now and into the future to be a part of the solution by being water 'smart' and 'wise', by installing as many rainwater tanks as we can fit and by educating the children in my care. I would like part of that education to be trips out to that beautiful valley and to stand with them and say that once upon a time they considered damming all of this, but they listened to the experts and thought it was better if they tried other ways and left it as it was for them to enjoy. How smart. How wise they were.

Yours faithfully,

Lorrie Cruickshank

[redacted]

9 September 2020

Our ref: NTS 149

By email only: council@rous.nsw.gov.au

Dear Rous County Council,

Future Water Project 2060 Submission – Widjabul Wia-bal People

NTSCORP Limited acts for the Widjabul Wia-bal People in relation to their native title determination application NSD1213/2018. This submission is made on behalf of the Widjabul Wia-bal People Native Title Applicant.

The Widjabul Wia-bal People object to 'Key Action 2' of The Future Water Project (FWP) 2060, being 'Augmentation to meet long-term demand needs: New 50 Gigalitre Dunoon Dam (**the proposed project**). The Widjabul Wia-bal People object to the proposed project on the basis that:

1. the Widjabul Wia-bal People have not been directly consulted with in relation to the proposed project;
2. Cultural Heritage Assessment has yet to be undertaken (since the Ainsworth Heritage 2013 Preliminary Cultural Heritage Report) and should be undertaken early in the planning stage of the proposal to inform the project going forward;
3. the Widjabul Wia-bal People understand there will be further opportunity for Cultural Heritage Assessment but are concerned that the proposed timeline does not allow for appropriate engagement and discussion with and input from the Widjabul Wia-bal People Native Title Claim Group prior to decisions being made; and
4. there are a number of culturally significant sites that fall within the proposed footprint of the Dunoon Dam (as set out in the Ainsworth Heritage 2013 report) which will be adversely impacted by the proposed project.

[redacted]

[redacted]

Yours sincerely,

[redacted]

Sarah Bartrim
Solicitor
NTSCORP Limited
[redacted]

[redacted]

7th September 2020

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To the Rous County Councillors and General Manager,

NSW Wildlife Information Rescue and Education Service Inc. (WIRES) welcomes the opportunity to make a submission on the Future Water Project 2060 and its potential impacts on our native wildlife and their habitat.

WIRES is Australia's largest wildlife rescue organisation and was formed in 1985. Almost 35 years later, WIRES has 28 branches, more than 3,000 members and assists hundreds of thousands of community members annually. WIRES mission is to actively rehabilitate and preserve Australian wildlife and inspire others to do the same.

WIRES dedicated Rescue Office operates 365 days a year, acting as the first point of contact for the community to provide wildlife information and education and emergency rescue advice and assistance for sick, injured and orphaned native animals. We receive around 170,000 calls to our 1300 number annually, including thousands of interstate calls. On average, WIRES assists tens of thousands of native animals each year, provides up to 80% of all wildlife rescue and care in NSW and plays an important role in national community wildlife education.

In addition, WIRES trains hundreds of new volunteers in wildlife rescue and care annually. Over 1,800 people have registered for introductory training in 2020 alone and we are dedicated to the ongoing recruitment of new volunteers and the continued training of existing volunteers. This growing network of volunteer rescuers and carers is critical for the rescue and rehabilitation of our unique native wildlife.

WIRES Northern Rivers branch services an 8800sq km area, taking in the local government areas of Byron, Ballina, Richmond Valley, Kyogle, and Lismore. It receives, on average, 25 calls for help a day and has a membership of 230 volunteer wildlife rescuers who between them and take more than 7000 animals into care annually.

After the catastrophic bushfires of last summer, where an estimated three billion animals perished, we are no longer operating under a 'business as usual' approach. In New South Wales alone, approximately 7% (5.37 million hectares) of land was burnt. This included 37% of the national park estate, 42% of state forests and 4% of freehold land[1]. In addition, a new report commissioned by the World Wide Fund for Nature-Australia found the 2019-20 bushfires resulted in the loss of about 71% of koala populations in fire affected areas at six locations on the north coast of New South Wales[2]. With this new reality and so much of our natural bushland lost, it is crucial that we reconsider projects resulting in habitat destruction and landscape modification, in order to protect and improve the outcomes for our remaining native species.

[1] State of New South Wales and Department of Planning, Industry and Environment. 2020. NSW Fire and the Environment 2019–20 Summary. Environment, Energy and Science Department of Planning, Industry and Environment.
[2] Biolink Ecological Consultants. 2020. Quantifying the impacts of bushfire on populations of wild (Phascolarctos cinereus): insights from the 2019/20 fire season. Prepared for WWF Australia

WIRES is concerned that the proposed Dunoon Dam, within the Future Water Project 2060, will negatively impact native wildlife, including threatened species, and the habitats they rely on for food, safety, and shelter. It is likely that these impacts will be observed both during the proposed construction period and during operation, well into the future. WIRES also notes that the environmental considerations for this proposal are based on ecological assessments conducted a decade ago, certainly quite different to the world we now find ourselves in.

However, even back then, one report lists some of the potential direct and indirect impacts as "*loss of habitat, direct mortality during clearing works and from machinery movements and the loss of vegetated links and corridors for wildlife movement. It is also possible that the inundation of the area may leave some animals stranded, causing them to drown if water levels rise too quickly. There is also the potential for injuries to animals as a result of taking fright from construction noise or movement of workers and plant within the study area*."[3]

This proposal seeks to clear a total of 272 ha of vegetation, some of which is the Endangered Ecological Community (EEC), Lowland Rainforest[4]. This "Big Scrub" vegetation, which once covered an area of approximately 75,000 hectares between Byron Bay, Ballina, and Lismore, was cleared for agriculture. By 1900, only 1% remained in the form of 100 small remnants scattered across a largely cleared landscape. The area that will be impacted by the dam will not only represent 5% of the remaining 1%, it is also occurs across two of the larger remnants of this vegetation type. The loss of these rainforest communities is particularly significant, given the regional history of clearance for timber and plantations and thus fragmented nature of the remnants. From the most recent ecological report *"…few areas of Warm Temperate Rainforest are known to occur within the locality on sedimentary geologies, such as those within the study area, and therefore this loss is considered to be regionally significant. The loss of these communities represents a significant loss within the locality; region and state as these are part of the Lowland Rainforest EEC"*.

The terrestrial survey, conducted in 2010, found that nine flora and 17 fauna species (including one frog, one mammal, one fruit-bat, six microbats and eight birds) listed as threatened in NSW were recorded within the area of the proposed dam. Of these species, eight flora and one fauna species are also listed nationally under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). An additional seven fauna species listed as migratory or marine under the EPBC Act as well as two Rare or Threatened Australian Plants (RoTAP) and three regionally significant plant species were also recorded. Assessment of the impacts determined that the proposed works would significantly impact all the threatened flora species detected and 15 of the 17 recorded threatened fauna species, along with their habitat within the study area.

Ecological assessments also concluded that the proposed dam and associated infrastructure is likely to present a barrier to existing wildlife corridors within the study area. The main species of concern will be Koalas, which are known to occur on the southern and western ridgelines, as connectivity between these two areas will be severed by the proposed dam wall and spillway. Given that a recent NSW parliamentary inquiry has found koalas are on track to become extinct in the wild in NSW prior to 2050 without urgent intervention to stop the destruction of

[3] Thompson, C. et al. 2011. Dunoon Terrestrial Ecology Impact Assessment. SMEC Australia Pty Ltd. Prepared for Rous Water
[4] Campbell, R & Menzies, K. 2020. Rous Regional Supply: Future Water Project 2060 Integrated Water Cycle Management Development: Assessment of Augmentation Scenarios Draft Report. Hydrosphere Consulting Pty Ltd.

their habitat[5] and that a number of Koalas have been recorded within the footprint of the proposed dam, it would seem that other options should be more closely scrutinised.

In the aquatic ecology assessment, three fish species, Eastern Freshwater Cod, Purple Spotted Gudgeon and Oxleyan Pygmy Perch were identified as potentially occurring in the study area[6]. In addition, the most recent aquatic field surveys, conducted in 2011, recorded Platypus individuals and burrows at sites within and downstream of the proposed inundation area. Given that recently published research predicts that platypus numbers could drop by as much as 73 per cent by 2070 and that they have disappeared from 40% of their known habitat[7], it is critical that we retain as much as we can.

Mitigation strategies suggested by the terrestrial impact assessment include using biodiversity offsets, however a detailed assessment was not undertaken at the time to determine offsets for this project. In any case, offsetting is not appropriate in this instance, given the unique nature of the vegetation and the presence of a number of threatened species. Another mitigation strategy recommends that a fauna ecologist be present during the clearing works for 'salvage'. Having an ecologist on site to manage wildlife during tree felling may slightly lower initial mortality rates, but with the loss of important habitat as the result of the dam, this appears to be an extremely short-term strategy.

Taking into account the above information, WIRES encourages the use of the precautionary principle, as referenced in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), in this instance and to consider alternative options as we cannot support the construction and operation of the proposed Dunoon Dam.

I hope you will take these matters into consideration and retain this area for the wildlife dependent on it.

Yours sincerely,

[redacted]

Leanne Taylor, WIRES CEO

Contact:
Jennie Murray
Projects & Grants Coordinator
[redacted]

[5] New South Wales. Parliament. Legislative Council. Portfolio Committee No. 7 – Planning and Environment. Koala populations and habitat in New South Wales / Portfolio Committee No. 7 – Planning and Environment [Sydney, N.S.W.]: the Committee, 2020. [xviii, 291 pages ; 30 cm. (Report no. 3 / Portfolio Committee No. 7 – Planning and Environment)
[6] Eco Logical Australia 2012. Aquatic Ecology Assessment for the proposed Dunoon Dam. Prepared for Rous Water.
[7] Bino, G. et al. 2020. A stitch in time – Synergistic impacts to platypus metapopulation extinction risk. Biological Conservation, Volume 242, February 2020.

BES Response to Rous Water Options Paper: 2020-2060

1. Introduction and Coverage Summary

The BES response addresses the following issues in relation to the above Rous Water Options Paper:

- Ground Water usage
- Additional Use and Upgrading of Marom Creek facility
- Deep ground aquafers
- Dam Construction
- Demand Management

BES accepts the premise that the increasing population in the Rous catchment area over the next 40 years will increase water resource and usage demand. BES further recognises that Rous Water in conjunction with relevant State bodies has undertaken substantial research into the water needs of the catchment area and has rejected expansive Ground Water offtake as a solution.

However BES contends that Rous's ultimate objective of resolving the water needs of the area by constructing an ancillary dam at Dunoon is flawed and ignores a wide spectrum of known environmental factors in the dam site surrounds and has offered too little attention to the improvement of Demand Management which again conforms increasingly to contemporary sustainable water usage philosophy.

2. Developing Realistic Environmental Options for Water Usage

BES represents a significantly more considered view on progressing the options in **Section 1** above.

- BES concurs that the use of **Ground Water** should be eliminated entirely.
- Similarly BES is highly sceptical of the use of **Deep Water Aquafers** in the plateau area. This creates an unenviable conflict and competition between agricultural water use and domestic supply. In addition too little scientific information is available on the source and supply reserves of these aquafers and the effect on the water table of substantial additional domestic use.

- BES agrees with the concept of creating more time to consider the development of options which make the construction of a dam both redundant and irrelevant . This position supports the upgrading of the **Marom Creek facility** and its wider distribution of water so that it buys increased time for Rous and Councils to develop widely adopted Water Demand Management strategies.
- BES is totally opposed to the **Construction of a Dam** in the sensitive and ecologically pristine Dunoon environment which is the proposed site. Both ecological concerns and aboriginal historical value demand their preservation and thus the prevention of a dam.
- The key strategy which BES supports thoroughly is substantial increase in **Demand Management** processes**.** Insignificant attention has been provided to this strategic initiative in the Rous Paper. It is BES's contention that **Demand Management** should have been the Key driver in the options provided by Rous. It is certainly accepted that logistical obstacles exist in the requirement that Rous gain commitments from the 4 Councils on the Core inclusions of a broad and comprehensive **Demand Management approach**. However BES contends that the $240 million allocated to the dam construction should be distributed to Councils on the basis of their achieving the agreed elements in an extensive Demand Management programme. This capital availability for accomplishment of measured elements in the programme would create the desired incentives for Councils to accelerate Demand Management progress and to share the benefits through community subsidisation

3. BES Proposals

BES presents the following proposals to implement a Demand Management Strategy Programme:

- All Councils develop a purple pipe delivery programme.
- Those councils who have recycling expand these to all areas of their communities
- All Councils develop a policy of enablement and subsidisation of tank water for potable purposes. All households should be encouraged to adopt tank water.
- Storm water storage systems and facilities should be devised. An array of small reservoirs should be established across the area encompassed by Rous.
- Greening of the street environment should be undertaken to cool the area and reduce evaporative levels.
- Councils should undertake a programme of evaluating their pipelines for water wastage and a schedule of renewal should be initiated.

- A programme of Water Wise should be adopted across council water delivery facilities so that savings are achieved by decreasing the cost of producing a litre of water.
- A powerful advertising programme should be undertaken to clearly publicise these benefits of Demand Management.

4. Conclusion

BES thus unequivocally rejects the need for the construction of a dam considering that the elements of Demand Management have not been implemented through the adoption of a formal programme that has full consensus of the involved Councils and is financially sponsored by Rous. Thus Rous Utility has the responsibility for the measurement and evaluation of the outcomes of the programme. Councils should only receive funding on the achievement of the goals of their agreed Demand Management programmes.
Water usage after all is a definitive aspect of Climate Change action and it is time that a clearly strategic approach to water usage is adopted so that Climate Change is supported.

The current Rous Water proposals do not achieve this necessity and thus avoid the clarion call of our current climate crisis. BES appeals that we do better than the current Rous proposals.

Graham Shaw
For and on behalf of Ballina Environment Society.

[redacted]

From: LACHLAN COOPER [redacted]
Sent: Wednesday, 9 September 2020 9:38 AM
To: Records
Cc: [redacted]
Subject: Re: Future Water Project 2060 - Feedback Submission

Dear Council Members,

I am a resident of Modanville and have lived in the Northern Rivers region since the late 1980's. I am a current Environmental Science Student at Southern Cross University and have tried my best to view the proposal from all views.

I wish to express my opposition to the 2060 Future Water Project that has been proposed. **I do not support the proposed Channon-Dunoon Dam.**

I have read over all the material provided by Ross water and while I do value water security, I object to the proposal based on the following concerns:

-I believe that we are not maximising the opportunities that exist for water efficiency. This includes better management of our current water usage, installation of more water tanks on urban and semi rural properties to capture water run-off and investigating the potential for water recycling. These options have the potential to offer many ongoing jobs in the region, far beyond what the dam proposal would provide once completed.

-Impacts on cultural and ecological assets. I have great concerns over the ecological and cultural impacts that this project will have on the direct area where the proposed dam will be constructed. The Channon Gorge is an area that needs to be protected due to its uniqueness in supporting the growth of rainforest on sandstone and providing habitat for several threatened flora and fauna species as has been listed in the Terrestrial Ecology Impact Assessment conducted in 2011.

I hope that members of Rous Council will review all the concerns expressed by residents and opponents before making any decisions on this proposal.

Yours Sincerely,

LACHLAN COOPER
[redacted]

[redacted]

From: David Fligelman [redacted]
Sent: Wednesday, 9 September 2020 1:47 PM
To: Records
Subject: Submission on RCC Future Water Project - David Fligelman and Adjunct Professor Ian Law
Attachments: Submission on Future Water Project - David Fligelman and Ian Law.pdf

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Hello RCC Team,

Please find a technical submission attached regarding the Future Water Project prepared. The submission is on behalf of:

David Fligelman
[redacted]

AND

Ian Law
[redacted]

As noted in the memo, The key documents reviewed and commented upon in this submission comprise:

- Integrated Water Cycle Management Development: Assessment of Augmentation Scenarios, Hydrosphere Consulting, Rev 2, 9 June 2020
- Preliminary Feasibility Report, Investigation of Water Reuse as an Additional Water Source, City Water Technology, Rev B, May 29 2020
- Flyover Virtual Landscape Model

In summary, the submission rejects the proposal as it currently stands as it identifies a new dam as the preferred option without having adequately or accurately considered potable reuse on its merits. Full details on the basis and reasons for this rejection are described in the attached file.

Please let me know if you have any queries, or would like any additional information in relation to this submission.

Kind Regards,

David Fligelman

TYR GROUP
Tyr Group | *Treatment and Reuse*

[redacted]

[redacted]

JAN BARHAM

[redacted]

Byron Shire Councillor (1999-2012), Byron Shire Mayor (2004-2012)
NSW MLC (2011-2017)

Rous County Council

council@rous.nsw.gov.au

To - General Manager and Councillors

9 September, 2020

Submission : Future Water Project 2060 – NO DAM !!!

I write to oppose the Future Water Project 2060 and it's consideration of The Channon -Dunoon Dam proposal. I do however thank you for the extension of the exhibition and submission period and hope the additional time and public discussion has encouraged greater community interest in this important decision for the future of our region.

I'm a local resident of almost thirty years and have family history going back a long while, including Charles Barham, the first Town Clerk of Lismore from 1888 to 1924. I served as an elected representative for 17 years, both on Byron Shire Council and in the NSW Legislative Council as a Green.

I support the implementation of **Ecologically Sustainable Development** (ESD) and the principle of carrying capacity of the environment. Our region is part of a biodiversity hotspot and the proposed destruction of our environment including the removal of irreplaceable Big Scrub forests and the threat to the survival of endangered fauna, including the koala for the urbanisation of our region is unacceptable.

I strongly support the recognition and protection of **Indigenous Heritage** and believe in a shared responsibility to protect and preserve First Nations history and sites and respect their deep connection and custodianship of the land. I urge Rous County Council to undertake further engagement with Aboriginal people to ensure a more respectful consultation in this process as it's clear that so far there hasn't been an acknowledgement of the significance of the area.

I opposed the Federal Dam back in the1990's and as a Byron Shire councillor advocated for strategies and proposals that delivered water efficiency and demand management. So, it's with sadness that I write this submission and my assessment that Rous hasn't learnt from the past and isn't presenting a plan for the future that's informed by science or respect for the regions cultural values.

There's no doubt that **water is a precious resource** and therefore the use of potable water for non-ingestion is an obvious unacceptable practice that must be addressed. Rous's priority should be to deliver improved ecological management of natural resources, informed by the best science and engagement to achieve greater efficiency and protect not destroy what is precious.

Rous is meant to represent the interests of the community of the north coast via the representation from constituent councils. This proposal lacks the foresight and vision that is a hallmark of this area. It's time for Rous to review it's priorities and deliver to the community a proposal that meets the community expectation and the decades of commitment to ESD, which is embedded in our laws and would deliver a more sensible and efficient approach to the management of natural resources.

My opposition to The Channon-Dunoon Dam proposal is based on

- A lack of adherence to **ESD** and the precautionary principle including the failure to consider the worst case scenario impacts of **climate change** and the protection of biodiversity.
- A lack of respect for **First Nations heritage** and connection to country by the proposed destruction posed by the dam proposal.
- A failure to fully explore the opportunities for comprehensive **water efficiency** outcomes that would also be more financially viable. There are many examples of supply options to meet future population that do not require the building of a dam and the delivery of unacceptable consequences - see Sydney Water outcomes identified in the Metropolitan Water Plan 2006.
- An unacceptable **loss of biodiversity values**, including the Channon Gorge and it's Endangered Ecological Community, Lowland Rainforest, a Nationally Critically Endangered Community (EEC) that would require the approval of the Commonwealth under the EPBC.
- An opposition to any consideration of **'offsetting'** ecological loss, an unacceptable option that doesn't meet ecological and scientific priorities for conservation management.
- A program of **increased urbanisation** of the far north coast council areas. The Far North Coast is not only a Biodiversity Hotspot, but also an area with significant f**armland** that is also put at risk by this proposal. Our region is also an iconic destination for **tourism,** primarily due to the natural environment and that would be impacted on by the building of the dam and the consequences of it's construction. The dam would facilitate proposed population growth that would further impact on the amenity and desirability of the area as a lifestyle and tourism destination.
- The failure to provide **alternative outcomes** and costs for more sustainable and efficient proposals.
- The failure to address the obvious **waste** that currently exists with water management in relation to potable water. The idea that the destruction of the Indigenous Heritage and biodiversity is being considered without due consideration being given to the how the region's water can be more efficiently used is embarrassing. How is it possible in the 21st Century that we are still allowing wasteful uses of potable water such as toilet flushing, car washing etc. these are unacceptable uses of our most important resource and Rous must address these outdated practices and regulate efficiency from

member councils. (note: I live in a rural area and am not a customer, I have water tanks, OSMS and a composting toilet.

I encourage Rous County Council to consider alternatives including

- The development of a **Water Efficiency and Demand Management Strategy** that encourages the efficient use of water and promotes improved household responsibility and management with obvious benefits for the region. This is an option that would create greater community awareness and responsibility. The development of a draft document based on sound management principles would also provide for input from our well-informed community and no doubt enhance any proposal put forward.
- The consideration of Professor Stuart White's proposal **'The Rous Sustainable Water Program'.** For those who are unaware of Stuart's work, he not only was instrumental in north coast thinking about water management over 20 years ago but is also a world recognised expert on water management and should be informing the current direction for our region.
- A stronger program for all Rous member councils to **implement demand management.** As development approval authorities, councils are well placed to prescribe improved water management for new developments as well as educate and encourage existing development to fix, upgrade and retro-fit.
- A focus on **recycled water** for non-potable uses
- A **fix it up program** that provides a detailed review of system losses and addresses the repair including consideration of funding support from government authorities for the repairs. This would be a far more financially sound outcome than the proposed expenditure on a new dam.
- A focus on the wasteful use of potable water by industry where it is obvious that recycled water would suffice.

Rous and it's constituent councils must take this opportunity to lead with the best ESD thinking that is available, the community expects and deserves it. It's a case of the north coast living up to the hype of being progressive and taking genuine responsibility for better informed ecological practice.

The **Rous, Mission, Vision and Values** statement needs reviewing
Partner with our constituent councils to provide quality services that support a sustainable and productive region.

this statement is quite meaningless without it including 'ecologically' in relation to sustainable and a definition of what is meant by 'quality services' and 'productive' is a meaningless term unless clarified. In recent times there is a tendency to focus on the inevitability of growth to accommodate it, I absolutely disagree. My experience as a resident and a representative is that this area more than other in the country not only has a proud history of protecting and preserving but continues to advocate and act to fulfil that responsibility.

I also note that Rous has a **Reconciliation Action Plan** and the website states
For RCC, reconciliation means recognising the importance of working with the Traditional Custodians of current and future catchment and natural resource areas managed by Rous County Council.

I would like to suggest a review of the RAP in relation to how this current proposal was progressed. I believe an apology is required from Rous for even suggesting the destruction of Aboriginal heritage. There's no way that the destruction of Aboriginal heritage meets the RAP intentions for reconciliation. The adoption of a RAP is meant to indicate a genuine commitment to respectful future relations. I recognise that Rous has done some excellent work with Traditional Custodians in relation to the management of Rocky Creek Dam.
This proposal doesn't reflect that the RAP objectives. The actions of government authorities who sign onto RAP's are what define a commitment. In this case, it appears that Rous has failed to meet the RAP commitment.

I look forward to the rejection of the dam proposal and a re-focussing of Rous's priorities to meet the challenges of the future with the most efficient and respectful processes to deliver ecologically sustainable outcomes for natural resource management and our shared future.

Yours sincerely

Jan Barham

[redacted]

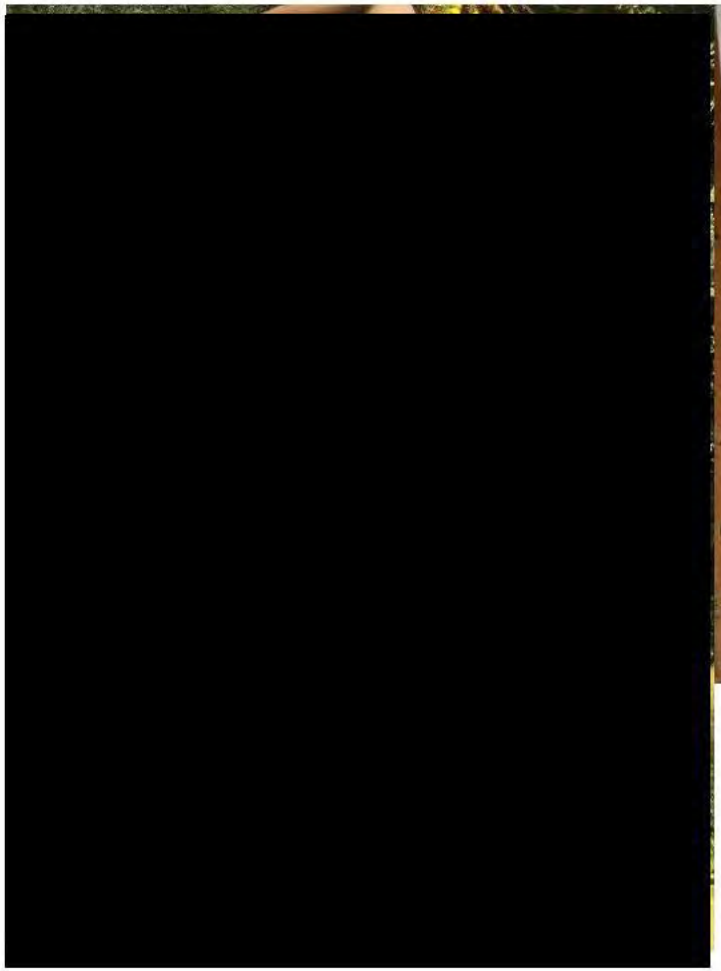
From: Terri Nicholson [redacted]
Sent: Wednesday, 9 September 2020 9:17 PM
To: Records
Cc: [redacted]
Subject: [By Elwood 10yo] RE: The proposed Dunoon Dam within the Future Water Project 2060

Elwood Nicholson-Moss (10yo boy) [redacted] 9th September 2020
Rous County Council,
Lismore NSW 2480
<council@rous.nsw.gov.au>
Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Please accept the attached submission by Elwood Nicholson-Moss (10yo boy) who has written/drawn a message to you to OBJECT to the proposed dam.

Message says:

Hi my name is Elwood and I am 10 years old. I highly recommend you don't build the dam because it will flood our beautiful rainforest as well as kill many creatures that inhabit that area now. This is why I don't want you to build the dam.
So please don't. NO DAM.
From Elwood Nicholson-Moss



8 September 2020

hi my name is ELwood and I am 10 years old. I highly recomend you dont build the dam because it will flood our bevtiful rainforest aswell as kill many creatures that inhabit that area. now this is why I dont want you to build the dam. so please dont.

from ELwood nicholson-moss

[redacted]

From: Mary Dorahy [redacted]
Sent: Thursday, 10 September 2020 11:20 AM
To: Records
Subject: Dunoon Dam objection - sorry it's late

Hi There,
I am writing to express my objection to the building of the Dunoon Dam. My concerns are based on:

- The impact on Aboriginal heritage in the proposed dam area
- Impacts on environmental biodiversity
- Potential detrimental effects up and down-stream including possible inundation of Whian Whian Falls
- Lack of evidence of research into possibilities for the development of alternative forms of supplying water and power needs in a growing community e.g. desalination powered by renewable energy.

I have signed a petition opposing the Dunoon Dam. Hope you will consider this letter,

Your sincerely,
Mary Dorahy

[redacted]

From: Mary Burton [redacted]
Sent: Monday, 14 September 2020 9:34 PM
To: Records
Subject: Future Water Project - 2060

CYBER SECURITY WARNING ? This message is from an external sender ? be cautious, particularly with hyperlinks and/or attachments.

Mary Burton
[redacted]

Dear Rous County Council

I object to a new dam being built in Dunoon for future water needs.
This is not an acceptable solution due to the environmental impact it will have on rare and threatened flora and fauna.

I request that an Environmental impact Statement is commissioned for this proposed Dam in order to verify the communities concerns regarding its environmental impact.

Please advise me of your response.

Kind Regards
Mary Burton

[redacted]

From: Michael McKenzie
Sent: Wednesday, 9 September 2020 12:26 PM
To: [redacted]
Cc: Records
Subject: FW: Late Submission - Lismore City Council

Dear Rod

I have received your message that the LCC submission will be received after the formal public submission period has closed. I'm pleased to advise that the LCC submission will be accepted, and considered as part of the exhibition of the Future Water Project.

If you have any queries please do not hesitate to contact me.

Regards

Michael McKenzie
Future Water Strategy Project Manager
Rous County Council
[redacted]

From: Customer Service Team <CustomerService@rous.nsw.gov.au>
Sent: Wednesday, 9 September 2020 11:42 AM
To: Michael McKenzie [redacted]
Subject: Late Submission - Lismore City Council

Hi Michael

Rod Haig called from LCC to advise the submission for the FWP from LCC will be late. He expects to have in by W/E 19/09 due to the GM being on leave.
He hopes that you will provide some leniency towards your constituent council and accept the late submission.

Thank you
Lynelle

Customer Service Team
Rous County Council
PO Box 230, Level 4 218-232 Molesworth St Lismore NSW 2480 | 02 6623 3800 |
CustomerService@rous.nsw.gov.au | www.rous.nsw.gov.au

ROUS
COUNTY COUNCIL

BULK WATER SUPPLY | WEED BIOSECURITY | FLOOD MITIGATION

Please consider the environment - do you really need to print this email?

Our offices and operations will be operating a little differently due to COVID-19. Rous County Council staff are still working to maintain all core services. Please help us work safely by showing your support from a distance. The best way to get in touch with us is through email council@rous.nsw.gov.au or by phoning (02) 66 233 800. Further information on how we are operating due to COVID-19 can be found on our website.

[redacted]

From: Jim Walter [redacted]
Sent: Thursday, 10 September 2020 12:22 PM
To: Records
Subject: new dam.

Dear sir / madam,
Please don't let the greens stop you from modifying or building a dam which will ensure water for our area in the future.
Regards,
Jim.

[redacted]

From: Satya McVeity [redacted]
Sent: Thursday, 10 September 2020 12:26 AM
To: Records
Subject: No new dam at the Channon/Dunoon area.

Dear Sir/Madam,
I am writing to object to the new dam proposed for the Channon/Dunoon area. It seems like it is an unnecessary development to destroy rainforest and farmland for this dam. Why is it that the local people have no say in this? Is the area running out of water that they have to make this dam? Last year was extremely dry and we did have bushfires in the Nightcap National Park and its surrounds but still we didn't run out of water and sure there were restrictions in the nearby towns, but that was the way it was for a lot of Australia last year.
There is a lot of water that is wasted in towns that are using Rous Water and this could be changed. How often are people being informed on water-saving strategies? Would this not be a good starting place? Unless town people are on water restrictions they basically can waste as much water as they like. Of course they will be billed for it but for those with money it isn't an issue. So for the rich that live at the coast that are building their blocks of units or whatever, it isn't an issue. We need to encourage our farmers by preserving this farmland. Dunoon is the macadamia capital of Australia after all. We also need to preserve our rainforest for all our endangered species and for our children's children. We have a terrible track record for disappearing fauna in Australia as it is.
I hope that you will view these objections to this project with consideration for the people and the wildlife that inhabit these areas. So much of our land is being developed and destroyed in the name of the almighty dollar. I hope this is not the case in this special little pocket of land.
Yours Sincerely
Satya McVeity

[redacted]

From: Christina Haywood [redacted]
Sent: Thursday, 10 September 2020 9:34 AM
To: Records
Subject: Possibility of dam, the area of The Channon

Dear Councillors

I understand the Rous County Council is re-opening investigations into building a dam in the above vicinity at an initial cost of $240 million.

I am a ratepayer, not of your LGA [redacted] and I sometimes enjoy the amenity of the beautiful area referred to above.

While I understand the attraction of attempting to solve the shortage of water problem by building a vast dam, as a ratepayer and resident
I am totally opposed to the idea.

I prefer the option of a water audit and finding smart, technologically efficient means to maintain water volume. It may take a lot of hard work to research and implement water-saving measures but it will pay off tenfold, I believe.

We have a considerable talent pool both within Australia and outide which can be drawn upon. We have talent, we just need willingness of the people we vote into positions of power to see how critical utilising water to the best of our ability is.

My views are based on
- technology is available
- environmental concerns, including fauna and native flora. Also the impact on the local underground structure and water table, and
- beauty amenity of the area.

I strongly oppose the dam construction.

I would be happy to expound my views. I am contactable on [redacted]

Yours sincerely

Christina Haywood
Ratepayer
[redacted]

[redacted]

From: Kelly Reiffer [redacted]
Sent: Friday, 11 September 2020 12:00 AM
To: Records
Cc: [redacted]
Subject: Proposed Dunoon Dam / Future water project 2060

Dear Councillors and General Manager,

I write regarding the proposed Dunoon Dam.

I am a resident of the [redacted] and currently travelling across Australia. When I crossed into Kununurra I was required to isolate for two weeks and during my time there, learnt about the Ord River Dam/ Lake Argyle.

What a disaster. Thousand of years of Miriwoong culture and history drowned. I urge you to read local artist Alana Hunt's recent piece on the dam: https://www.artlink.com.au/articles/4800/violent-dreams-of-development-a-food-bowl-in-the-n/

(As both an innovation strategist and curator, I find that artists often convey the situation better than statistics.)

I find it bewildering that the Northern Rivers brands itself as being progressive yet, in 2020, is considering the construction of a centralised water source rather than requiring that every home install a rainwater tank, soft drainage and other measures that have been used by my good friend, Michael Mobbs, ('the sustainable house guy') in his inner city property for the past 24 years.

I do not support the proposed Channon-Dunoon Dam.

We can do better.

Sincerely,
Kelly Reiffer
[redacted]

[redacted]

From: Liora C [redacted]
Sent: Thursday, 10 September 2020 12:21 AM
To: Records
Subject: Re premature closure of submission time
Attachments: Future Water 2060 submissions closed.JPG

Dear Sir

I went online as advised in the council newsletter to fill the form out and submit it before midnight. I filled the submission form out giving my strong disapproval of the project however when I went to submit it I was told that submissions were closed even though it was not yet midnight. I would like to speak to someone about having my submission accepted.
Sincerely,
Liora Claff
[redacted]

Basically I agree that we need to act to secure water for the future but not at the expense of the flora and fauna that have lost so much in the bush fires and we must begin to respect Indigenous culture - not just pay lip service to it.

This proposed dam will not benefit our community, it will destroy the Channon Gorge - UNTHINKABLE!!! There are other ways to live sustainably on the planet. Desalination, Recycled water, water tanks, planting trees to support the lifecycle of fresh water creation.

I have copied and pasted my form and re-written parts that didn't copy.
Sincerely, Liora Claff

FUTURE WATER PROJECT 2060 - FEEDBACK SUBMISSION FORM

Thank you for taking the time to submit your feedback on Rous County Council's Future Water Project 2060 proposed plan.
Please complete the form and submit by the **9th of September, 2020**.
Details on the general submission process and suggestions on how to make a good submission are available here.
Information on the Future Water Project 2060 is available on the Rous County Council's website.

About this form:

- An *asterisk indicates a mandatory question.
- This form automatically saves so that you can close the form and return to it at a later stage before you submit.
- It is estimated that this form will take you 10 minutes to complete.

If you have any questions about this form - contact Rous County Council.

Select your age category.

[redacted] years

Select your gender.

Female

Do you identify as Aboriginal and/or Torres Strait Islander?

YESNO

What is the postcode of your usual place of residence?

[redacted]

In which local government area is your usual place of residence?

[redacted]

Are you a town water customer via either your local council or directly connected to Rous?

YESNO

Were you involved in the Future Water Strategy 2014 community consultation process?

YESNO

How did you hear about the Future Water Project 2060?

check_box
Print newspaper
check_box
Facebook
check_box_outline_blank
LinkedIn
check_box_outline_blank
Rous County Council website
check_box_outline_blank
Television
check_box_outline_blank
Radio
check_box_outline_blank
Online newspaper
check_box
Word of mouth
check_box_outline_blank
Formal information session
check_box_outline_blank
Local council e-news or newsletter
check_box_outline_blank
Other

Have you reviewed any of the Future Water Project 2060 documents?

YESNO

What documents did you find most useful, if any?

Please indicate how you agree to the statements below:

STRONGLY AGREE: I am familiar with Rous County Council (RCC) and understand what they do.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

STRONGLY AGREE: The information provided, enables me to understand why RCC decided on specific strategies to secure future water supply.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

STRONGLY AGREE: We should act now to secure the water supply we will need for our future.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

STRONGLY DISAGREE: I support the Future Water Project 2060's direction for securing future water.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

Please comment on why you strongly disagree/disagree:
It is ignoring indigenous culture, sites and advice
The bush and animals have lost enough - we cannot keep stealing their habitat. We are part of a whole ecosystem - if we keep destroying ecosystems we are destroying our own habitat as well.
There are other ways - more sustainable and less expensive ways to secure water for the community

STRONGLY DISAGREE: I support the preferred options to secure the region's future water, inclusive of the Dunoon Dam project.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

STRONGLY DISAGREE: I support the alternative options to secure the region's future water being multiple groundwater sources within our region.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

Please provide your views on how we should provide water security for our region.

Tanks, harvesting from the atmosphere, growing trees. living with nature, recycling water and desalination plants.
I am concerned about the economic implications of the Future Water Project 2060.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

I am concerned about the environmental implications of the Future Water Project 2060.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

I am concerned about the cultural heritage implications of the Future Water Project 2060.
[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

I support the short term actions as a part of the decision.

[ ]strongly disagree[ ]disagree[ ]agree[ ]strongly agree

Please comment on why you strongly disagree/disagree:

Do you have any further feedback about any aspect of the Future Water Project 2060?

Submit

Submissions are closed at this time.

Liora (Lalita) Claff
[redacted]

Everything we put in or on our bodies should at best be
nourishing & supporting and at worse be 100% safe.

. . The Dalai Lama, when asked what surprised him most about humanity, answered: " Man, because he sacrifices his health in order to make money. Then he sacrifices his money to recuperate his health. Then he is so anxious about the future that he does not enjoy the present; the result being that he does not live in the present, or the future; he lives as if he is never going to die, and then dies having never really lived."

[redacted]

From: Julie Gerrish [redacted]
Sent: Thursday, 10 September 2020 9:45 AM
To: Records
Cc: [redacted]

Subject: Re: The Proposed Dunoon Dam as part of the Future Water Project 2060
Attachments: southern_angle_headed_dragon_by_foadii_d7j5so3-fullview.jpg; images.jpeg-7.jpg

Luke Gerrish
[redacted]

8th September 2020
Rous County Council,
Lismore NSW 2480
council@rous.nsw.gov.au

Dear Rous Councillors and General Manager

Re: The Proposed Dunoon Dam as part of the Future Water Project 2060

I appreciate the extension afforded the community to comment regarding the proposed Dunoon Dam, within the Future Water Project 2060. I offer the following concerns for your consideration.

I have lived on [redacted] of NSW for over 30 years. I am fortunate to have spent the majority of my life, from childhood, within the Northern Rivers region. I have called [redacted] my home. I have a strong connection with this area, a love and respect for nature and an affiliation with the bush.

I do not support the proposed Dunoon Dam and here are my major concerns:

The destruction of the second largest remnant of the "Big Scrub" subtropical rainforest, and of lowland rainforest including geographically rare, mid-temperate rainforest occurring on sandstone, with only a fraction of the original Big Scrub rainforest remaining, surely these types of endangered ecological communities should be preserved and added to the existing World Heritage listed Big Scrub Reserve.

The area of the gorge, "Ground Zero", where the Sandstone forest meets the creek is breathtakingly beautiful; it is irreplaceable and one of a kind. It is in the nation's, indeed the world's interest for it to remain intact and be protected for generations to come. This can only happen if the construction of the dam does not occur.

On a global level Science is just beginning to develop a deeper understanding of the interconnectedness of ecosystems upon our planet and their interdependence. We are tipping point of irreversibly damaging these fragile links.

It is understood that councils are required, under state planning regulations to: *Focus development to areas of least biodiversity sensitivity in the region and implement the "avoid, minimise, offset" hierarchy to*

biodiversity, including areas of high environmental value." (NSW Dept. of Planning, Industry and Environment, 2019). This is such an "area ".

So with Australia's horrific track record of species extinction and decline, and many plants and animals currently threatened or endangered, critically close to becoming extinct, it would be far too great a loss to see the destruction and further endangerment of our precious and rare flora and fauna, with 24 threatened animal species and 19 threatened plants as identified in the *Rous Ecological Surveys, 2011 ,* including animals such as the endangered Fleay's Barred Frog, the threatened Stephen's Banded Snake, the Southern Angled -headed Dragon which "*are endemic and only occur in these types of forest ecosystems." (Reptiles and Amphibians of Australia. H.G. Cogger)*.

Found in Rocky Creek are fish such as the extremely rare and vulnerable East Coast Cod and the Australian Bass. The dam wall will block their migratory movements, affecting their life-cycle and causing genetic islanding (*Rous Ecological Surveys, 2011.)*

Numbers of the Spotted Tailed Quoll are declining and we run the risk of repeating the fate of other types of quolls i.e. the Eastern Quoll, "*rare, possibly extinct on the mainland"* (*Godsell, J. The Population Ecology of the Eastern Quoll, 1982)* and the Western Quoll, once common throughout Australia, now only found in one isolated corner of W.A.

The Yellow Bellied Glider, whose populations are distribution, although wide, is declining. It *" feeds exclusively upon red mahogany tree sap"* which grow within the designated dam site (*The Australian Museum Complete Australian Mammals, 1983).*

The Richmond River Birdwing Butterfly, a local symbol in conservation efforts, is threatened through land clearing and *"with its increasingly fragmented pockets of habitat, a cause for concern for its long-term survival" (The Butterflies of Australia. Albert Orr and Roger Kitching).*

Birds such as the Australian Bittern "and the now uncommon Red Goshawk would be at further risk should the proposed development take place *(Birds of Australia. G. Pizzey, F* . Knight, rev 2010)

Many other species depend upon these vulnerable types of forest ecosystems for survival and with habitat destruction posing the greatest threat and development being the major contributor. How could a Council, made conscious of this, destroy such an area?

<u>The Desecration of Widjabal Wiyabal culture via the destruction of culturally significant sites</u>

The Rouse Reconciliation Action Plan, 2017 enabled councils to acknowledge that Rous County consisted of land areas that form the identity, through culture, spirituality and connection to country, of the Widjabal Wiyabal indigenous community. This dam would directly undermine this acknowledgement.

The Cultural Heritage Impact Assessment, 2011 clearly underlines that the dam would have considerable impact upon important indigenous archaeological sites, including burial grounds, artefacts, and ceremonial waterholes, sites deemed as "*of historical and cultural significance",* it is the opinion of many that the construction of the dam would show a complete and utter disrespect of any understanding of the Widjabal Wiyabal traditional laws, knowledge, connections, stories, teaching and spirituality. Construction of this dam would totally belie Council's intention to conduct itself in accordance with its values of integrity, trust, social responsibility and accountability.

I urge you to heed the strong arguments and powerful reasoning of the many people in our community who oppose the construction of the Dunoon dam, including ecologists, conservationists, academics, botanists, farmers, land owners, teachers, and students.

There is a wealth of knowledge at your disposal and well documented science in favour of smarter, economically and environmentally safer, sounder and more sustainable methods and alternatives in water resource management …… but that's your job.

Yours faithfully

[redacted]

LUKE GERRISH

[redacted]

From: John Grant [redacted]
Sent: Thursday, 10 September 2020 4:28 PM
To: Records
Cc: [redacted]
Subject: RE: The proposed Dunoon Dam within the Future Water Project 2060

TO: Rous County Council

I am writing to express my concerns around the proposed Dunoon Dam. I feel that there needs to be an independent review of the process that has delivered the current recommendation of another dam on Rocky Creek. A brief review of some of my concerns are outlined below:

A broader consideration of water supply

Rous County Council is in the business of supplying water. Its main function (in addition to weed management and flood mitigation) is the '*regional water supply authority providing water in bulk*'. It has, by definition, a vested interest in being the primary supplier of water and therefore would receive no benefit in divesting control of all or part of that water supply to consumers. There is a need for independent assessment from a whole of society and ecosystem outcomes perspective. A systems approach has not been fully explored. For instance, the installation of tanks as a compulsory requirement for new houses and as strongly encouraged through more generous subsidies for existing houses could supply a significant proportion of household water requirements. There are approximately 20 000 dwellings in Lismore. If they captured the rainfall that fell on their roofs, that could potentially provide (very roughly) at least 1 Ml of water. Extension of such a scheme across of Ballina, Byron and Kyogle would provide significant amounts of water in comparison to a new dam. There should also be more careful consideration of the placement of the proposed dam. Putting it a short distance downstream to an existing dam places all your eggs in one basket (reliant on one relatively small part of the Richmond catchment with one treatment plant). In a changing climate with longer dry spells and heavier rainfall events this is an extremely risky strategy.

Loss of agricultural land

The importance of local, regional and national food security has been highlighted by the breakdown of international trade due to Covid-19. A tiny proportion of Australia's land has high quality soils and sufficient rainfall to provide high agricultural productivity (Prime Agricultural Land/Biophysical Strategic Agricultural Land). The proposed dam sits across a significant area of such land.
How sustainable is the dam? Land management practices in the dam catchment areas is, in areas, exceedingly poor. Estimates of erosion (USLE) from parts of the catchment exceed 100 tonnes of soil per hectare per year. The dam itself is likely to be short lived with these levels of input. There are no management plans presented as part of the dam strategy to address these issues.

Biodiversity

Local ecologists are concerned around the quality of the ecology report particularly regarding threatened species and the high ecological values of the site. There are many other threatened species that the report acknowledges as requiring further targeted surveys. Biodiversity is under extreme threat around the planet and is being increasingly disregarded in this rush for unnecessary and poorly considered plans.

Recreational Use

There is a lack of clarity around recreational use of the dam should it go ahead, and this reflects the ad hoc nature of the process.:
Keith Williams stated that the Dunoon Dam would be available for public recreation:
https://www.echo.net.au/2020/07/rous-water-chair-puts-case-for-the-dunoon-dam/
But the Rous Water Policy: Private Recreation Community Events and Commercial Uses on Operational Land policy' (2014) shows that permitted activities in the Proposed Dam excludes **any** recreational activities (except at Whian Whian Falls).
And the current Rous dam feedback submission site (https://rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-KZG-22-16-87) states that recreational opportunities exist **but** would require a 'comprehensive risk assessment ….(to)… be undertaken in later stages of the project should the dam proceed'.

Indigenous rights
Inadequate consideration of the rights needs and of local Widjabal people.

Kind Regards,
John

[redacted]

From: allan andreasen [redacted]
Sent: Saturday, 12 September 2020 12:49 PM
To: Records
Subject: Stop the dam proposed for Channon gorge!

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Dear Chairman and board of Rouse Council, I am writing this letter in hopes that I can encourage you to think more carefully before flooding the cannon gorge to make this new dam at this time. Would you please consider doing a water audit and plan a substantial water saving program before taking the 'easy' way out and destroying natural habitat at the Channon Gorge. A water saving program could create many jobs, would help us to reduce our water wastage in light of new information and save money in the long run. instead of using 240 million dollars to flood 253 hectares of precious rainforest please invest in an audit of our water and where it all goes, how we can improve our water usage. All this has been proven in Sydney when they did an audit and managed to provide an extra 950 000 people with water and not changing consumption at all.
Sincerely,
Hilde, Allan, Jo and gully Andreasen.

[redacted]

From: Anasuya [redacted]
Sent: Sunday, 13 September 2020 11:52 PM
To: Records
Subject: Submission re Dunoon Dam

Dear Lynelle,

Thank you for accepting this on Monday morning given that the submissions closed early.

I would like to register my strong disagreement to the Future Water Project 2060's direction for securing future water, particularly and most definitely inclusive of the Dunoon Dam project.

In your own report it clearly states that the dam is not the best option: "Based on the MCA, the most favourable scenario is groundwater. The groundwater scenario has a lower NPV as well as less significant environmental and social impacts." In our current climate we must find new ways of doing things. There are many options for saving, harvesting and re-using water that could be investigated & invested in - options which support the local community whilst saving natural habitat & heritage sites - particularly in light of the bush fires (and possibly more to come). Dams destroy & change local ecosystems & landscapes & we often do not understand the full ramifications of these changes for years. We need to keep our natural water structures in place to ensure that the region thrives. I didn't read anything about the impact of stopping the water flow of this natural area. And indeed, time and time again all across the world dams, and destroying natural ecosystems, lead to drastic problems. It is time to 'think outside the dam' and move forward into clever water use & efficiency.

This is not to say that I believe using groundwater is the best way forward either - more research into other options is needed. I would like to see investigation into other more sustainable ways of securing water. For example - harvesting dew, harvesting rainwater, re-using water, system efficiency and investing in agriculture (both commercially and personally) that is smart about its water usage. There are so many options out there. For example, I understand that by focusing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. We are moving into a new era and Rous has a wonderful opportunity to lead the way and be recognised as a front runner in this area - we have the perfect region & the perfect population for it! I have recently been told about Michael Mobbs, who has many great ideas on how to secure water for our future, how to save water and how to live more sustainably.

I understand that this is an important decision and that water security is a big issue. However, for the projected increase in population in our area and with many water saving fixes available I don't understand how destroying unique natural habitat (which we have no idea what impact this will create in the grand scheme of things), unnecessarily causing the death of many species, destroying our indigenous heritage and going forward with a massive project that will cost a huge amount of money against the will of the community could be seen as the best decision.

Remember - think outside the dam!

Thank you.

Kindly,
Anasuya Claff
--
Think Before You Print
1 ream of paper = 6% of a tree and 5.4kg CO_2 in the atmosphere
1 sheet of A4 paper = 10 litres of water

[redacted]

From: Lyn Walker [redacted]
Sent: Thursday, 10 September 2020 1:25 PM
To: Records
Subject: Submission re rous Water Project 2060
Attachments: Rous Water Project 2060.docx

Rous Water

Re: Rous Water Project 2060.

submission from

Dr Lyn Walker

(word text copy attached.)

I specifically refer to the proposal to build a new dam at Dunoon.

I unequivocally oppose the dam.

Reasons

1.**Sufficient in itself is the totally unacceptable ecological damage**.

It is time that we recognise that it is not acceptable to destroy rare and valuable ecological assets for any reason. Rio Tinto is discovering that no matter how rich the goal is some things are too valuable to blow up. Humans need to recognise that the same applies to significant ecological systems. The area of the Dunoon dam encompasses one such. It cannot be biobanked.

I expect Rous Water to be green enough to know the value of that ecosystem.

I expect previous environmental studies said that clearly.

2. **Also sufficient itself is the local indigenous heritage.**

Local peoples have spoken before and there should have been no reason to ignore them this time.

3. **There are alternatives.**

Even the options failed by the coarse assessment method in the Hydrosphere report can be part of the solution, eg tanks. There is no logical reason to suppose that each option should stand alone as the solution.

Rous water needs to examine the possible contribution of a whole sheaf of proposals that were examined.

4. **Cost in monetary terms is not the only criteria** as I have argued above. A spread of options has not been costed so a cost advantage for the dam is not assured.

5. **Jobs will be created by whatever means are used** to secure the future water supply. Probably more of them than with a dam that would by its nature rely a good deal on heavy machinery rather than a diverse localised workforce that a spread of options would use.

Conclusion.

The dam should be dropped by virtue of its ecological and heritage significance.

There is a greater case for a spread of smaller options than the dam.

If the proper groundwork is done it is possible that many smaller proposals would be better both economically and in terms of jobs.

Lyn Walker

[redacted]

[redacted]

From: Susie Hearder [redacted]
Sent: Thursday, 10 September 2020 12:01 AM
To: Records
Subject: Submission re the proposed Dunoon Dam within the Future Water Project 2060

Dear Rous Councillors and General Manager,

This is my Submission re the proposed Dunoon Dam within the Future Water Project 2060

I do not support the proposed Channon Dunoon Dam for various reasons but most importantly on environmental grounds.
272 hectares of vegetation would be destroyed and this would remove important linkages for all kinds of threatened species and it would also destroy an endangered ecological community of lowland rainforest and the Channon Gorge. This Includes the destruction of regionally rare warm temporate rainforest on sandstone with its threatened flora and fauna.
Apart from the threats to flora and fauna the Channon Gorge and its surrounding forest is a picturesque and important natural asset to the local community which is incredibly important for the health and wellbeing of the human species as well.

There will also be destruction of Aboriginal Heritage which must be retained.
This is a huge dam which will destroy this local natural asset and there are more sustainable ways to conserve water such as recycling and catching more runoff from houses directly to fulfill future water needs.

Thankyou for considering my input.

Susie Hearder
[redacted]

[redacted]

From: [redacted]
Sent: Thursday, 10 September 2020 1:01 PM
To: Records
Subject: Submissions

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Can we study our methodology around actually getting storm water back into the local soil, dams are great for human supply and intensive agriculture but leaves the deep hydrology drying leading to stressed trees and fires.

Kind regards

Will GOODE
Sent from my Huawei Mobile

[redacted]

From: Emily Wah Day [redacted]
Sent: Monday, 14 September 2020 10:28 PM
To: [redacted]
Subject: The proposed Dunoon Dam within the Future Water Project 2060

Thank you for the opportunity to make a submission re this project, and apologise that I have missed the submission deadline.

I object to the creation of Dunoon Dam for the following reasons;
1. Being a resident on a farm, with tank and dam water for house use and livestock use, I am very aware of water usage, and so is my family.
I believe that creation of a dam would not encourage residents, businesses, industries or councils to manage the water resources we currently have in an efficient manner.
I believe there are many strategies that need to be explored:
Such as permanent Level 1 water restrictions, so we get used to saving water at all times of the year. Exploring retrofitting households and businesses to have dual water systems - recycled water for toilet flushing etc. Perhaps some financial assistance to encourage this (funded by the money spent on building a new dam) Looking at inefficiencies in the system - like water leakages in pipes etc. Collecting more rain by households, businesses with subsidised tanks.
In the future we could be looking at water recycled to a degree that we can reuse that as potable water. I remember a friend mentioning this to me many years ago, and I felt squeamish about the thought, but now I think what a great idea. Why are we flushing potential drinking water into our oceans? It may not be a popular idea, but like all change requires the community to be gradually brought around to the idea.
2. The financial cost of this huge project, and the effect on water users charges.
3. The environmental and cultural cost of flooding the area required to build this dam. I believe there are Aboriginal burial sites in the area. Destruction of the Channon gorge and rainforest - planting more forest in another area will not replace what is lost. I imagine there are impacts on fauna as well.
4. Whilst I do not live in the area of this dam, I would sympathise with the residents in the construction area and the impacts of this on their lives and properties.

I wonder if building a dam is "old school", like making a new coal mine, when renewable energy is the way to go.
I would strongly encourage Rous County Council to explore a range of strategies for ensuring water supply for the future in a sustainable way, not just looking at building a new dam.

your sincerely

Emily Wah Day
[redacted]

[redacted]

From: William Goode [redacted]
Sent: Sunday, 13 September 2020 7:17 PM
To: Records

Kerb&guttering, sounds innocuous, but where does it go, I'll tell you where it goes, straight to river, do not past go, do not collect 200, straight to river, and on to sea, draining and drying the land, as quickly as possible.
All hard surfaces, rooves included, not to forest, but straight to natural drainage channels, rivers and away, away with all the water we "use" from Dams, yes treated, but a net lose to the land, and no where is this more true, than heavily built up, forested areas like California.
Can we do better than California in our soil moisture management ?
There was a time before environmental flow was taken seriously, maybe now is the time to go further, to environmental soak away, particularly to enhance forest remnants.

Kind regards

WILLIAM JOHN GOODE
[redacted]

[redacted]

From: [redacted]
Sent: Saturday, 12 September 2020 3:25 PM
To: Records
Attachments: text_0_1599888318423.txt

Dear Rous Councillors,

Im writing to you about your future plan proposal to dam rare sandstone rainforest around Terania Creek & farmland. I really do believe there can be a better way for people to survive without destruction of wildlife areas that bring in tourists from within Australia & from around the world.

You never see Tourists planning a day trip to Clarrie Hall Dam to enjoy the same sort if ambience they will get up the top of Mt Nardi, Mebbin State Forest, Lamington National Park, The Pinnacle, Queen Mary Falls, Wollumbin/Mt Warning National Park or any other area around our ancient Caldera which is truly irreplaceable. This draws people interested in our past & our future from around the globe. That will never change, covid19 or no covid19. Not unless Councils do the wrong thing & ruin long term security for this part of the rare east coast of Australia.

I can't give you figures, stats or a pie graph but I will say that if you're concerned about more residents living here, there are many ways to keep our water infrastructure viable - installing rainwater tanks on any new building, reticulated water in septic treatments on homes not hooked up to council sewerage, new long-term water saving ways for cleaning sewerage & limiting daily usage of water, incentives to get residents interested in saving on water. Also commercial businesses need to stand up & install reticulated grey water for toilet systems & watering gardens, like all the Tourist attractions, Council parks & gardens should be using reticulated water for grey water areas like toilets & gardens

I've been in this area since I was 16years old & Im now in my 60s. I own two properties & homes & have been a nurse here all my life & I'd hate to see this beautiful rare gem that I call home be turned into something like a mixture between the Gold Coast & Ipswich! That would truly break my heart. My 45 yo son, my daughter in law & 8yo grandson all call this place home & we are proud to be part if this vibrant diverse community & honest to God, I'd never want this area to end up like a Sydney suburb. Please do your bit to keep it in it's pristine condition.

We all come here for a short time & in our own way we all hope we can leave our home in a better condition than it was when we first came. That is how I am with my two homes, I am trying to be a good Steward for this generation & leave things better than they were.

Please do your best & secure our beautiful home for the generations that will be the next Stewards coming through after we leave.

Yours Faithfully
Colleen

Colleen Bateman
[redacted]

&

[redacted]

[redacted]

9 September 2020

Mr Phillip Rudd
General Manager
Rous County Council
PO Box 230
LISMORE NSW 2480
By email: council@rous.nsw.gov.au

Dear Phillip

Public exhibition of Future Water Project 2060

I refer to Rous County Council's public exhibition of its Future Water Project 2060 (FWP).

Lismore City Council acknowledges the hard work your Council has done to ensure long-term water security can be provided for our region; which is critical for the health and economic growth of the community. Lismore City Council engineers have evaluated the FWP and concur with its conclusions that, in the long-term, construction of the proposed Dunoon Dam is the most cost-effective means of achieving necessary increases in the secure yield of the water supply. As outlined in the FWP, construction of the Dunoon Dam will ensure water demands can be met for a longer term in the future than that applicable to other alternatives considered. Construction of the Dunoon Dam itself will also promote economic growth of the region.

However, as acknowledged within the FWP, construction of the dam would have significant environmental and cultural heritage impacts; that will require rigorous assessment prior to a final decision on construction of the dam being made. Any further environmental assessments would be required to meet the requirements of the NSW Biodiversity Conservation Act, the NSW Fisheries Management Act and the Commonwealth Environmental Protection and Biodiversity Conservation Act.

Another issue of significant concern to Lismore City Council is the impact that traffic associated with the dam's construction would have on our road network. This would need to be the subject of further negotiation to determine appropriate measures to ameliorate these impacts.

I am more than happy to arrange a meeting with our engineering team to discuss this further with you if required.

Yours faithfully

[redacted]

Shelley Oldham
General Manager

[redacted]

Records of the Australian Museum (2005)

New Crayfishes (Decapoda: Parastacidae: *Euastacus*) from Northeastern New South Wales, Australia

JASON COUGHRAN

School of Environmental Science and Management,
Southern Cross University,

ABSTRACT. Routine astacological surveys in northeastern New South Wales have revealed four new species of crayfish. Three species are allied to the "*setosus* complex", a group of small and poorly spinose *Euastacus* previously recorded only from Queensland: *E. girurmulayn* n.sp. from the Nightcap Range, *E. guruhgi* n.sp. from the Tweed volcanic plug and *E. jagabar* n.sp. from the Border Ranges. These three species are differentiated chiefly on features of the sternal keel, spination and antennal squame. *Euastacus dalagarbe* n.sp., recorded from the Border Ranges, has affinities with a growing group of crayfish displaying morphological traits intermediary between the *setosus* complex and more characteristically spinose *Euastacus*. It differs markedly in spination of the chelae, and in the nature of the lateral processes of the pereiopods. All of these taxa occur in association with the much larger and more spinose *E. sulcatus*. An unusual crayfish specimen of uncertain status is also discussed.

COUGHRAN, JASON, 2005. New crayfishes (Decapoda: Parastacidae: *Euastacus*) from northeastern New South Wales, Australia. *Records of the Australian Museum* 57(3): 361–374.

Recent taxonomic revision of the genus *Euastacus* (Morgan, 1986, 1988, 1997) resulted in both the description of several new species and synonymies of others, including the synonymy of the genus *Euastacoides* (Riek, 1956) with *Euastacus*. Together with a new species of *Euastacus, E. jagara*, the genus *Euastacoides* was designated by Morgan (1988) as a group of small, poorly spinose *Euastacus* (the "*setosus* complex"), not sufficiently different to warrant recognition at the generic level. Moreover, Morgan (1988, 1997) pointed out that several species bear intermediary traits between the *setosus* complex and those of the genus generally, strengthening this synonymy.

Historically there has been a paucity of sampling in the northeastern New South Wales area, resulting in few sites of taxonomic record for the three species of *Euastacus* known from the area: *E. gumar* (two proximal sites), *E. sulcatus* (two sites) and *E. valentulus* (several sites). These three species are distinct from the *setosus* complex, being medium to large in size and of moderate to strong spination. Recently, increased sampling in the region extended the distribution of *E. gumar* and *E. sulcatus* and revealed a further species, *E. mirangudjin*, morphologically intermediate between the *setosus* complex and *Euastacus* generally (Coughran, 2002).

The current paper describes four new species of *Euastacus* discovered during continued surveys of the region, one of which, *E. dalagarbe* n.sp., also bears characteristics intermediate in nature. The remaining species, *E. girurmulayn* n.sp., *E. guruhgi* n.sp. and *E. jagabar* n.sp., are allied to the *setosus* complex itself. A key to all species of *Euastacus* found in southeastern Queensland and northeastern New South Wales is provided. An unusual specimen collected during the research, which displays some characteristics of *Euastacus* yet differs markedly in structural morphology, is also discussed.

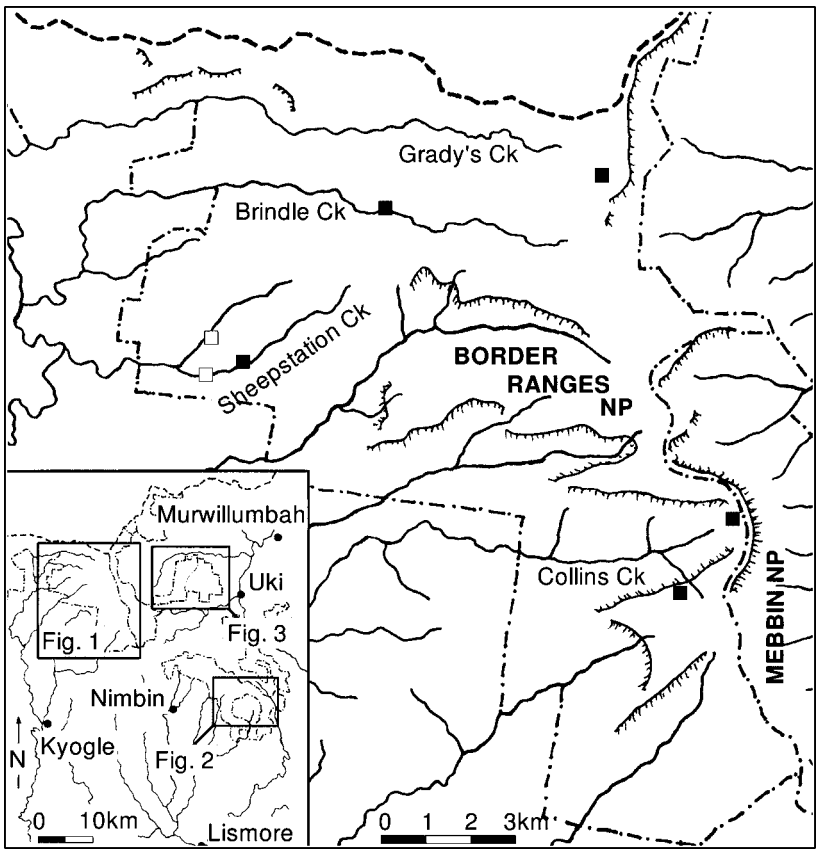


Fig. 1. Collection localities of *Euastacus dalagarbe* (black squares) and *E. jagabar* (white squares) in northeastern New South Wales. All sites are in the Border Ranges National Park. Location of collecting areas in Figs. 1–3 are shown in the inset.

Methods

Sampling involved lifting rocks and woody debris and collecting crayfish by hand. Although other methods were employed (baited traps, spotlighting, visual observation), they were only successful in catching the larger and sympatric *Euastacus sulcatus*. Collection localities are shown in Figs. 1–3. Basic water quality and habitat information was recorded, and all retained animals were transported to Southern Cross University in moist hessian sacks, before being euthanased by freezing. Specimens were fixed in 10% neutral buffered formalin for two weeks, thereafter stored in 70% ethanol. Some specimens were preserved directly in ethanol. Colour was described while animals were alive, and photographs taken of live animals to record it. Elevations were estimated from 1:25000 topographic maps, and bearings recorded with a Garmin handheld GPS (or estimated from 1:25000 topographic maps where specified).

Measurements of preserved specimens were made to the nearest 0.1 mm with dial vernier calipers, and measurements and ratios follow those used by Morgan (1986). Specimens in the process of moulting were excluded from measurements and ratios. Gastric mill characters were examined for selected specimens. Obviously regenerate chelae were not included in ratios used. Spine characteristics and other morphological traits used in the descriptions follow those of Morgan (1986). Character states that follow the latest revision of the genus (e.g., size, sharpness) have been described according to the illustrative framework provided therein (Morgan, 1986, 1988, 1989, 1997). For other character states, the term "sharp" refers to spines that are produced to a distinct point, and "blunt" to those that are not. Relative sizes of characters are provided for comparative purposes, and are standardized as "small", "medium" or "large".

Type specimens have been deposited with the Australian Museum (AM) collection. Holotypes of similar species were examined from the collections of the AM and Queensland Museum (QM), as outlined below. Other animals examined are housed in the Southern Cross University reference collection (SCU).

Comparative material. *Euastacus jagara*, holotype, QM W6471; *Euastacus maidae*, holotype, AM P12888; *Euastacus setosus*, holotype, AM P12887; *Euastacus urospinosus*, holotype, AM P12886; *Euastacus reductus*, holotype, AM P15731; *Euastacus mirangudjin*, identified material as follows: SCU KCK.gd.09, Iron Pot Ck (type locality), 3♀♀; SCU KCK.gd.10, upper reaches of Iron Pot Ck, 2♀♀; SCU KCK.gd.11, wet gully in Murray Scrub, 2♂♂, 2♀♀; SCU KCK.gd.12, Cob O'Corn Ck, 3♂♂, 3♀♀.

Euastacus dalagarbe n.sp.

Fig. 4

Type material. HOLOTYPE: AM P67884; male (OCL 35.8 mm); minor gully feeding Brindle Creek (rainforest), Border Ranges National Park, northeastern N.S.W.; 28°22.789'S 153°04.334'E; elevation 760 m; J. Coughran; 22 October 2001. PARATYPES: AM P67885; 4♂♂, 4♀♀ (OCL 9.0–32.5 mm); type locality; J. Coughran; 27 September 2001. AM P67886; 1♂, 1 aberrant male (OCL 25.1–31.3 mm); upper Collins Creek (rainforest), Border Ranges NP; 28°25.978'S 153°07.656'E; elevation 880 m; J. Coughran; 22 October 2001. AM P67887; 2♂♂, 2♀♀ (OCL 18.9–31.7 mm); upper Grady's Creek, Lost World Wilderness Area (rainforest), Border Ranges NP; 28°22.182'S 153°06.422'E; elevation 890 m; J. Coughran & D. Newell; 2 October 2003. AM P67888; 4♂♂, 3♀♀ (OCL 13.7–30.1 mm); tributary to Sheepstation Ck; Sheepstation Creek

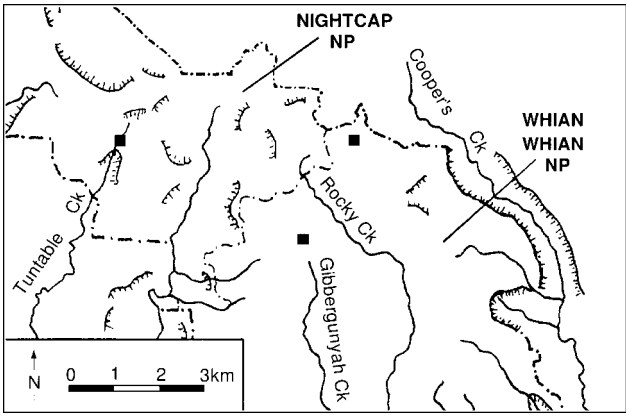


Fig. 2. Collection localities of *Euastacus girurmulayn* in northeastern New South Wales. The previous Whian Whian State Forest has been designated as National Park since collection.

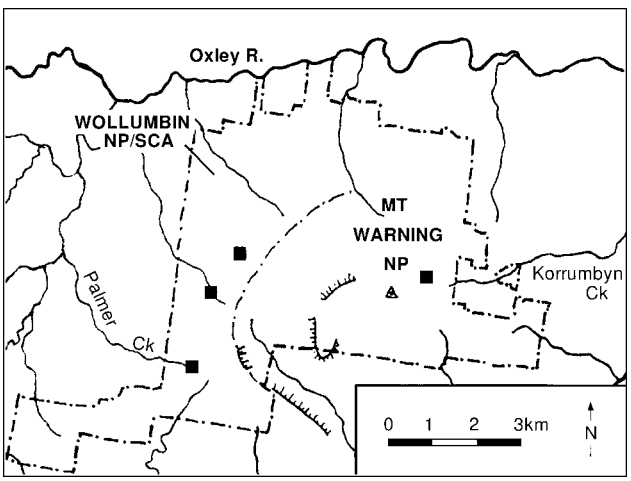


Fig. 3. Collection localities of *Euastacus guruhgi* in northeastern New South Wales. The previous Wollumbin State Forest has been designated as National Park and State Conservation Area since collection.

Flora Reserve (rainforest), Border Ranges NP; 28°24.085'S 153°02.247'E; elevation 570 m; J. Coughran & D. Newell; 28 November 2003. AM P67913; 1♂, 2♀♀ (OCL 21.4–30.1 mm); un-named wet gully, Bar Mountain (rainforest), Border Ranges NP; 28°27.500'S 153°07.710'E (topographic map); elevation 960 m; J. Coughran & D. Newell; 28 November 2003.

Type locality. The type locality is in a minor gully feeding Brindle Creek, a westward-flowing tributary of the upper Richmond River, approximately 30 km north of Kyogle. One paratype (32.5 mm male) is the only specimen caught in Brindle Creek itself, despite repeated sampling. While Brindle Creek is large (up to 10 m in width), this animal was collected from a shallow, quiet backwater of Brindle Creek, seasonally fed by a minor gully. All other specimens (including several released after capture) were found in small gullies and tributaries feeding Brindle, Collins, Grady's and Sheepstation Creeks. These watercourses are typically very small in nature, and often nearly or completely void of surface water for a considerable part of the year.

Other specimens examined. SCU KCK.gd.13; 1 ♀ (OCL 33.6 mm); type locality; J. Coughran; July 2003. SCU KCK.gd.14; 3♀♀ (OCL 14.2–19.3 mm); upper Collins Creek (rainforest); 28°25.978'S 153°07.656'E; elevation 880 m; J. Coughran; 22 October 2001. Several other specimens collected from the Brindle Creek sites were examined briefly before being returned to the water.

Fig. 4. *Euastacus dalagarbe*. Dorsal view, holotype, AM P67884. Photograph: Max Egan. Scale bar is 10 mm.

Diagnosis. Male cuticle partition present. Rostrum short, usually reaching to base or midlength of third antennal segment. Thoracic spines absent. Li abdominal spines either absent or present as 1–3 barely discernible bumps or small and blunt spines on abdominal somite 2, occasionally 1 bump also on somites 3–4. Lii spines, D-L spines, D spines and abdominal boss absent. 3 mesial carpal spines. 1 ventromesial carpal spine present on normal chelae, distinctly smaller than ventral carpal spine. Ventrolateral propodal spine row absent. Dorsal surface of propodus lateral to dactylar base without bumps, spines or protrusions. Ventrally, 1 small to medium and blunt spine lateral to dactylar base. 0–2 (usually 1) small dorsal apical propodal spines. 0–3 (usually 1–2) spines above propodal and dactylar cutting edges, spines apical in distribution. Spines ventral to propodal and dactylar cutting edges absent. Usually 1 apical mesial dactylar spine. Other apical dactylar spines and dactylar basal spines absent.

Description. Maximum OCL: 35.8 mm. —*Rostrum*. Rostrum short, reaching to base or midlength of third antennal segment, almost to anterior edge of segment on largest specimen. Rostral margins parallel to slightly convergent. Rostrum broader on specimens from Brindle Creek. Rostral carinae short. Usually 2–4 marginal spines

per side (one specimen with 1 spine on one side), rounded and decreasing in size proximally. Acumen similar in size to largest marginal spines. OCL/carapace length: 0.83–0.88. Rostral width/OCL: 0.15–0.21. —*Cephalon*. Some animals with 1 blunt cephalic spine, absent on some specimens and 2–3 spines on some specimens. Few to numerous smaller, blunt and anteriorly-directed bumps ventral to cephalic spine present on all specimens. First postorbital spine small to medium and blunt. Second postorbital spine absent. Basipodite spines absent. Coxopodite spines generally small. Interantennal spine broad, with 1–3 (usu. 2) bumps or spines per side and a prominent, blue apex. Suborbital spine barely discernible to small. Antennal squame inflated at, or distal to, midlength, and lacking marginal spines. Interantennal scale length/OCL: 0.08–0.13. —*Thorax*. 3–5 small cervical spines per side, barely discernible on some specimens. Cervical spines flattened and blunt. Thoracic spines absent. General tubercles small to medium in size and moderate to densely distributed. Areola length/OCL: 0.35–0.39. Areola width/OCL: 0.16–0.22. Carapace width/OCL: 0.46–0.54. Carapace depth/OCL: 0.46–0.52. —*Abdomen*. Li abdominal spines either absent or present as 1–3 barely discernible bumps or very small and blunt spines on abdominal somite 2. Two specimens with 1 barely discernible bump on somites 3 and 4. Li spines and bumps often discernible mainly by paler colouration. Lii spines, D-L spines and D spines absent. Abdominal boss absent. Abdomen width/OCL: 0.46–0.52. OCL/total length: 0.38–0.42. —*Tailfan*. Standard tailfan spines generally small to medium. Telsonic and uropodal surface and marginal spines absent. Telson length/OCL: 0.32–0.38. —*Keel*. Pair 1 usually close, slightly apart on some specimens, and parallel to slightly closed. Pair 2 close, slightly apart or apart and usually slightly open or parallel, closed on one specimen. Pair 3 narrow to medium breadth and with gradual margins. Pair 4 broad. —*Chelae*. Usually intermediate in shape, elongate on paratype. Regenerating chelae usually elongate. *Merus*. 4–8 small and blunt spines. *Carpus*. 3 mesial carpal spines, distalmost distinctly larger and sharper than, and offset ventrally to, other spines. Two specimens with a fourth minute mesial carpal spine on one claw, and one specimen from Bar Mountain with 2 spines (distalmost absent). Ventral carpal spine large and sharp. A single, blunt ventromesial spine present, much smaller than ventral spine. Regenerate chelae of Collins Creek specimens with 1–2 additional ventromesial carpal spines. Usually 1 (occ. 2) insignificant lateral carpal spines, discernible mainly by pale colour. Dorsal carpal spines absent. Dorsal carpal groove deep. *Propodus*. Dorsal lateral propodal spine row extending to between ½ and ⅔ of propodal length from apex (reaching entire length of propodus on regenerate chela of one specimen). Ventrolateral propodal spine row absent (1 barely discernible spine on regenerate chela of one specimen from Collins Creek). 3–5 mesial propodal spines (6 on one regenerate chela from Collins Creek). Mesial propodal spines usually numbering 4, with a distinct gap between first spine (at distal edge of propodal palm) and second spine. Spine at distal edge of palm often poorly developed. Specimens from Grady's Creek, Sheepstation Creek and Bar Mountain with 5 mesial propodal spines. Dorsal propodal surface lateral to dactylar base usually distinctly smooth (some minor development of protuberances on some Bar Mountain specimens). Ventrally, 1 small, blunt spine lateral to dactylar base (absent on one regenerate chela). 1–2 small dorsal apical propodal spines (usually 1), occasionally absent. 2–3 blunt bumps dorsally at dactylar articulation. Spines posterior to dactylar articulation absent. Spines above propodal cutting edge either absent or numbering 1–2 (3 on some regenerate chelae), if present spines small and apical. Spines ventral to propodal cutting edge absent. Propodal length/OCL: 0.89–1.14. Propodal width/propodal length: 0.41–0.47. Propodal depth/propodal length: 0.25–0.34. *Dactylus*. Usually 1–2 small spines above dactylar cutting edge on dorsal surface (absent on one specimen; 0 or 3 on some regenerate chelae). Spines ventral to dactylar cutting edge absent. 1 apical mesial dactylar spine, barely discernible or small (absent on one specimen; two specimens with 2 spines on 1 chela). Other apical dactylar spines absent. Dactylar basal spines absent. Dactylar length/propodal length: 0.53–0.59. —*Punctation*. Sparse to moderate. Punctation especially sparse on dorsal region of cephalon, giving a "polished" appearance on some specimens. —*Setation*. Sparse to moderate, short, stiff setae on thorax, cervical groove and lateral cephalic regions. —*Gastric Mill*. TAP count 3.5; TAA count 1.0; spread 2.5. Urocardiac ridges 4–6.

Colouration. Body dark green brown to brown dorsally, tending to brown ventrally. Abdomen brown, with barely discernible Li spines paler than surrounding areas. Walking legs washed pale tan to dull orange ventrally, coxa dull orange. Postorbital spine blue with a yellow tip. Cervical and cephalic spines orange or brown. Merus and carpus of chelae dorsally green-blue, ventrally orange or tan tinged blue along mesial edge. Propodus dorsally brown to green-brown, mottled on palm and generally darker mesially. Propodus ventrally orange or brown (light blue on one animal from Bar Mountain) with green mottling, bright orange at base of fingers and around dactylar articulation. Fingers of chelae deep green-blue, tending to blue apically, especially on dorsal surface. mesial carpal spines blue with white or yellow tips. Lateral carpal, ventral carpal, ventromesial carpal and ventral meral spines yellow to orange. Mesial and lateral propodal spine rows blue, with pale yellow-green spines with white tips. Propodal and apical dactylar spines white to brown. Spine above cutting edges white to dull yellow-green.

Sexes. Males possess a cuticle partition. A 28.3 mm OCL female specimen from Grady's Ck has calcified gonopores. A further female from Grady's Ck with an OCL of 30.5 mm has gonopores which are mostly calcified but are opening (bear a small membranous portion within gonopore). A 29.3 mm OCL female from Brindle Creek has membranous gonopores with light setation around the margins. Thus, it would appear that maturity occurs close to 30 mm OCL.

Biology. The species inhabits moist gullies and small streams which are largely void of surface water for at least part of the year. They are found under rocks in the red clay of the rainforests, where they inhabit burrows into the subsurface water. It would appear that *Euastacus dalagarbe* to some extent partitions the habitat with the considerably larger and spinier species, *E. sulcatus*, the former being excluded from the larger habitat of the main creek channel. Both species can, however, occur together in the smaller habitat, and have been collected from under the same rock. *Euastacus dalagarbe* hosts small, white temnocephala.

Etymology. A blend of the Bundjalung Aboriginal words *dalagar* (mud) and *garbe* (gully) (Sharpe, 1985), describing the species' habitat.

Euastacus girurmulayn n.sp.

Fig. 5

Type material. HOLOTYPE: AM P67914; ♀ (OCL 33.9 mm); Tuntable Creek, above falls (wet sclerophyll with rainforest understorey), Nightcap National Park, northeastern N.S.W.; 28°33.234'S 153°17.785'E; elevation 460 m; J. Coughran and A. Coughran; 14 October 2002. PARATYPES: AM P67915; 1♂, 1♀ (OCL 22.4 mm, 26.8 mm); type locality; J. Coughran; 20 September 2002. AM P67916; 1♂, 1♀ (OCL 22.5, 22.6 mm); Gibbergunyah Creek (rainforest gully), Whian Whian National Park, northeastern N.S.W.; 28°34.786'S 153°20.305'E; elevation 580 m; J. Coughran; 18 October 2002; AM P67917; 1♀ (OCL 30.6 mm); unnamed gully in the Cooper's Ck catchment along North Rocks Rd (rainforest gully), Whian Whian NP; 28°33.809'S 153°21. 033'E; elevation 550 m; J. Coughran; 18 October 2002.

Type locality. The type locality is in Tuntable Creek, above the falls, in Nightcap National Park, approximately 30 km north of Lismore. The holotype was collected from a large rock at the stream margins, approximately 500 m upstream of the falls.

Diagnosis. Male cuticle partition present. Rostrum short, but usually reaching base of third antennal segment. 2–3 small and rounded rostral spines. Suborbital spine small to medium. Inflation of antennal squame narrow. Lateral cephalon with 1–4 small cephalic spines and a few smaller bumps per side. Coxopodal plate irregular, usually with a broad zone of spines forming a jagged edge to the plate. Thoracic spines absent. Usually 1–4 cervical spines per side. General tubercles small and moderately distributed. 1–4 Li spines (or bumps) usually present on abdominal somites 2–6, with large specimens bearing more spines. Other abdominal spines and abdominal boss absent. 7–12 dorsal meral spines. 4 mesial carpal spines, the distalmost being the largest, with variation in the alignment of spines. Ventrolateral propodal spine row absent. Spines above propodal cutting edge usually absent (1 specimen with 1 spine). 0–1 dorsal apical propodal spines. 4–5 mesial propodal spines. 1 small and blunt spine above dactylar cutting edge. 1 apical mesial dactylar spine. A single spine lateral to dactylar base ventrally. Dactylar groove distinct. Lateral processes with moderate to well-defined margins. Keel Pair 2 close and parallel to open. Keel posterior to pair 3 reduced and deflated at sides, forming a narrow ridge.

Description. Maximum OCL: 33.9 mm. —*Rostrum*. Rostrum short, usually just reaching base of third antennal segment (extending only to midway of second antennal segment on one animal from Gibbergunyah Ck). Rostral carinae short to medium length, convergent at sides and divergent at base. 2–3 rostral marginal spines per side. Spines varying in location along the rostrum, with four possible spine locations evident and all animals lacking spines in some positions (and often unequal on different sides of the rostrum). Acumen slightly larger than marginal spines and rounded. Rostral carinae short. OCL/carapace length: 0.87–0.90. Rostral width/OCL: 0.15–0.18. —*Cephalon*. Usually 1–4 small cephalic spines, and a few smaller bumps. First postorbital spine small to medium and blunt to moderately pointed. Second postorbital spine absent. Basipodite spines usually absent, but animals from Tuntable Ck with a small spine on one or both sides. Coxopodal plate irregular, usually with a broad zone of spines forming a jagged edge to the plate, or with two large, triangular teeth; in extreme cases, plate looking grossly misshaped (North Rocks gully animal). Interantennal scale elongate to medium. Scale margins usually smooth (one animal from Tuntable Ck slightly toothed). Suborbital spine small to medium. Antennal squame lacking marginal spines and with narrow inflation, at or slightly posterior to midlength. Interantennal scale length/OCL: 0.07–0.10. —*Thorax*. 1–4 cervical spines per side on most specimens (absent on specimen from North Rocks gully). Thoracic spines absent. General tubercles small and moderately distributed. Areola parallel or only slightly incurved at centre. Areola length/OCL: 0.34–0.38. Areola width/OCL: 0.15–0.18. Carapace width/OCL: 0.47–0.51. Carapace depth/OCL: 0.37–0.42. —*Abdomen*. Li spines absent on somite 1. Usually 1–4 vague bumps or blunt spines in the Li position on abdominal segments 2–6, although all specimens bar the holotype lack spines on some segments. Holotype with 2–4 small spines on somite 2, 3–4 small spines on somites 3–5 and 1 spine on somite 6. Li spines absent on one small specimen from Gibbergunyah Ck. Lii spines, D-L spines and D spines absent on all specimens. Abdomen width/OCL: 0.44–0.48. OCL/total length: 0.41. —*Tailfan*. Standard tailfan spines medium. Telsonic and uropodal surface and marginal spines absent. Telson length/OCL: 0.3–0.34. —*Keel*. Pair 1 close and parallel. Pair 2 close and parallel to open. Pair 3 narrow to medium breadth, and with gradual posterior margins (elongate). Pair 4 broad.

Fig. 5. *Euastacus girurmulayn*. Dorsal view, holotype, AM P67914. Photograph: Max Egan. Scale bar is 10 mm.

Keel posterior to pair 3 reduced and deflated at sides, forming a narrow ridge. All lateral processes with moderate to well-defined margins. —*Chelae*. Elongate to stout. Regenerate chelae usually more elongate than normal chelae. *Merus*. 7–12 small and poorly developed spines. *Carpus*. 4 mesial carpal spines, with some differentiation between populations as to the alignment. In animals from Tuntable Ck, only the first (distalmost) spine is offset ventrally. The first and third mesial carpal spines are offset ventrally in the animal from North Rocks gully, and only the fourth spine is offset ventrally in the Gibbergunyah Ck animals. Ventral carpal spine small and blunt. 1–3 ventromesial carpal spines on normal chelae, extending in a row from ventral spine towards the second mesial carpal spine. Ventromesial carpal spines increasing in size mesially, with the outermost being immediately ventral to, and similar in size to, the second mesial carpal spine. A single lateral spine present at distal edge of carpus, insignificant or small. Dorsal carpal spines absent. Dorsal carpal groove deep. *Propodus*. Dorsal lateral propodal spine row extending from apex to midlength or as far as ⅔ of propodal length (spines notably smaller and blunter on the specimen from North Rocks gully). Ventrolateral propodal spine row absent. 4–5 mesial propodal spines, usually 4 with a distinct gap between first (at distal edge of propodal palm) and second spines. Spines in some positions indistinct or damaged. 1 spine lateral to dactylar base dorsally (absent on one regenerate chela). 1 small spine lateral to dactylar base ventrally. 1 small dorsal apical propodal spine on most specimens, absent on some animals. Holotype with 1 large spine on one chela and 2 small spines on the other. 2 large, blunt bumps at dactylar articulation dorsally, more pronounced on the specimens from Tuntable Ck. Spines posterior to dactylar articulation absent. Precarpal spines absent. Spines above propodal cutting edge (dorsal surface) usually absent (holotype with 1 apical spine on one chela and 1 at midlength on other). Propodal length/OCL: 0.75–0.92. Propodal width/propodal length: 0.43–0.48. Propodal depth/propodal length: 0.28–0.33. *Dactylus*. 1 small, blunt spine above dactylar cutting edge on dorsal surface, absent on smaller specimens. 1 medium and blunt apical mesial dactylar spine (spines small on one specimen from Gibbergunyah Ck). Other apical dactylar spines and dactylar basal spines absent. Dactylar groove distinct. Dactylar length/propodal length: 0.56–0.62. —*Punctation*. Sparse and shallow on cephalon, less distinct and sparser laterally. Punctation on chelae also sparse but more distinct. —*Setation*. Setation light on body and abdomen, moderate on walking legs. Dense clumps of long, uneven setae protruding from punctures in chelae, especially on fingers. Distinctive bristly setation around and on lateral processes of pereiopods, and around coxa of pereiopods of some animals. —*Gastric Mill*. TAP count 3.0–3.5; TAA count 1.0; spread 2.0–2.5. Urocardiac ridges 4.

Colouration. Body dorsally brown, with lateral branchiostegites lighter (often a rich tan colour). Animals often with blue patches on lateral cephalon above anterior end of cervical groove. Body ventrally cream. Walking legs cream or pale purple-grey, with cream coxa. Carpus and propodus light brown dorsally with a distinct, darker veining pattern. Fingers dark brown, tending blue or cream apically. Carpus ventrally orange-brown, tinged blue-brown mesially and brown laterally. Propodus ventrally cream-brown or pale bluish-grey with a darker veining pattern of brown or blue, orange-brown or green-brown near dactylar articulation and with blue or cream finger-tips.

Sexes. Males possess a cuticle partition. The large female from Tuntable Ck (33.9 mm OCL) is mature, with soft, membranous gonopores heavily fringed with setae. Other females, including the 30.6 mm OCL animal from North Rocks gully, have closed gonopores without setae, suggesting that maturity occurs in females after reaching 30 mm OCL.

Biology. The species was collected from somewhat different habitats at each of the three populations. Tuntable Ck is a small, permanent stream with a gravel and cobble bed overlying solid bedrock. The animals were collected from under rocks at the stream margins or on exposed shoulders. The gully along North Rocks Road lacks surface water entirely, and the animal was collected from under a rock next to the road culvert. The Gibbergunyah Ck site is high in the headwaters of the creek, and the habitat consists of a few basaltic cobbles and boulders and dense vegetative debris over fine, red earth. At this site, animals were collected from under cobbles and palm fronds, and even from under the same frond as a larger specimen of *E. sulcatus*, which is also present at Tuntable Ck. *Euastacus girurmulayn* hosts small, white temnocephala.

Etymology. From the Bundjalung Aboriginal words *girur* (smooth, slippery) and *mulayn* (crayfish) (Sharpe, 1985). In general terms, this is the least spinose member of the *setosus* complex.

Euastacus guruhgi n.sp.

Fig. 6

Type material. HOLOTYPE: AM P67926; ♀ (OCL 25.2 mm); Korrumbyn Creek, adjacent to visitor carpark (rainforest), Mount Warning National Park, northeastern N.S.W.; 28°23.875'S 153°16.893'E; elevation 410 m; J. Coughran and A. Coughran; 12 April, 2002. PARATYPES: AM P67918; male (OCL 23.5 mm); type locality; J. Coughran and A. Coughran; 12 April 2002. AM P67919; 1♂, 2♀ (OCL 17.0–32.5 mm); un-named creek running parallel to Brummies Rd (rainforest), Wollumbin National Park, northeastern N.S.W.; 28°23.587'S 153°13.875'E; elevation 320 m; J. Coughran; 5 September 2002. AM P67920; 1♂, 1♀ (OCL 24.8 mm, 22.4 mm); un-named gully along North Wollumbin Rd (rainforest), Wollumbin NP; 28°23.304'S 153°14.013'E; elevation 440 m; J. Coughran; 5 September 2002. AM P67921; 1♀ (OCL 17.5 mm); Palmer Creek (rainforest), Wollumbin NP; 28°24.723'S 153°13.705'E; elevation 430 m; J. Coughran; 5 September 2002.

Type locality. The type locality is in the main creek adjacent to the visitor carpark at Mt Warning National Park, approximately 15 km southwest of Murwillumbah. The holotype was collected approximately 200 m upstream of the intersection of the creek and the walking track.

Diagnosis. As for *E. girurmulayn*, except: Rostrum varying in length, extending to the midlength of the second antennal segment or as far as the anterior tip of the third antennal segment. 2–4 small, blunt rostral spines per side. Antennal squame lacking marginal spines and inflated at or slightly distal to midlength. Li abdominal spines usually just discernible. 4–8 just discernible or small dorsal meral spines. 1 dorsal apical propodal spine. Dactylar groove absent or shallow. Lateral processes with blunt to moderate margins. Keel Pair 2 slightly apart and slightly open. Keel posterior to pair 3 usually broad and strongly developed, and fusing smoothly with the lateral processes of the third and fourth pereiopods.

Description. Maximum OCL: 32.5 mm. —*Rostrum*. Rostrum varying considerably in length, extending to midlength of second antennal segment or as far as the anterior end of the third antennal segment. Rostral carinae short, convergent at sides and divergent at base. 2–4 small to medium and blunt rostral marginal spines per side. Acumen usually similar in size to, or slightly larger than, marginal spines (acumen smaller than marginal spines on the specimen from Palmer Ck). Rostral carinae short to medium length. OCL/carapace length: 0.87–0.90. Rostral width/OCL: 0.12–0.18. —*Cephalon*. 2–4 medium cephalic spines, and a few smaller bumps, per side. First postorbital spine usually medium to large and blunt (small on specimens from North Wollumbin gully). Second postorbital spine absent. 1 small to medium basipodite spine present. Specimens from Mt Warning and Palmer Ck have basipodite spines on the right hand side only. Coxopodite irregular, either with 2 large spines (Mt Warning specimens), or a broad zone of small spines giving a serrate edge. Interantennal scale broad, margins smooth. Suborbital spine small to medium. Antennal squame lacking marginal spines and inflated at or slightly distal to midlength. Inflation narrow to moderate and reduced on left hand side on some animals from "Brummies" Ck and the North Wollumbin Rd gully. Interantennal scale length/OCL: 0.06–0.10. —*Thorax*. Cervical spines usually barely discernible, but largest animal with 4 small spines. Thoracic spines absent. General tubercles small to medium and moderately distributed. Areola incurved at centre. Areola length/OCL: 0.35–0.39. Areola width/OCL: 0.14–0.16. Carapace width/OCL: 0.49–0.54. Carapace depth/OCL: 0.38–0.44. —*Abdomen*. Usually 1 just discernible Li spine or bump on abdominal somites 3–6 (absent on small specimens). Somite 2 with 2–4 just discernible or small Li spines (absent on some specimens). Lii spines, D-L spines and D spines absent. Abdomen width/OCL: 0.44–0.52. OCL/total length: 0.40–0.44. —*Tailfan*. Standard tailfan spines medium. Telsonic and uropodal surface and marginal spines absent. Telson length/OCL: 0.3–0.37. —*Keel*. Pair 1 close and parallel. Pair 2 slightly apart and slightly open (apart and open on Mt Warning specimens). Pair 3 narrow to medium breadth, and with gradual posterior margins (more elongate). Pair 4 medium to broad. Keel between pairs 3 and 4 broad and strongly developed, and fusing with the lateral processes of the pereiopods, giving a swollen appearance. Lateral processes with blunt to moderate margins, in extreme situations giving a swollen appearance to the sternum. —*Chelae*. Intermediate to stout (regenerate chelae more elongate). *Merus*. 4–8 just discernible to small, and poorly developed, dorsal meral spines. *Carpus*. Usually 4 mesial carpal spines, first (distalmost) and third spines offset ventrally to second and fourth. Some regenerate chelae have 3 spines, and one animal has 3 spines on a normal chela and 4 on a regenerate chela. Ventral carpal spine small to medium, barely discernible on some small animals. Some regenerate chelae lack ventral carpal spines. 3–4 small to medium and blunt ventromesial carpal spines on normal chelae (regenerate chelae usually with two spines, although one regenerate chela with 5 spines). Ventromesial spines extending in a row from ventral spine towards the second mesial carpal spine, and increasing in size mesially, with the outermost being immediately ventral to, and similar in size to, the second mesial carpal spine. A single lateral spine present at distal edge of carpus, insignificant or small. Dorsal carpal spines absent. Dorsal carpal groove deep. *Propodus*. Dorsal lateral propodal spine row extending from apex to as far as ⅔ of propodal length (to around midlength on most specimens). Ventrolateral propodal spine row absent. Usually 4 mesial propodal spines, with a distinct gap between first (at distal edge of propodal palm) and second spines. One specimen from Mt Warning has 5 distinct mesial propodal spines, and some regenerate cheale have 3 or 5 spines. Usually 1 spine lateral to dactylar base dorsally. Some chelae with 2 spines, and one specimen from "Brummies" Ck has 5 spines on a normal chela. Another specimen from "Brummies" Ck has 1–2 spines and some additional small bumps lateral to the dactylar base. Usually 1 barely discernible to small spine lateral to dactylar base ventrally (one specimen from "Brummies" Ck has 2 spines; spines usually smaller or absent on regenerate chelae). 1–2 small to medium dorsal apical propodal spines (absent on small animal from Palmer Ck). 2 large, blunt bumps at dactylar articulation dorsally. Spines posterior to dactylar articulation absent. Precarpal spines absent. Spines above propodal cutting edge (dorsal surface) absent (1 spine on

Fig. 6. *Euastacus guruhgi*. Dorsal view, holotype, AM P67926. Photograph: Max Egan. Scale bar is 10 mm.

one chela of one specimen from "Brummies" Ck). Propodal length/OCL: 0.78–0.98. Propodal width/ Propodal length: 0.45–0.52. Propodal depth/propodal length: 0.31–0.37. *Dactylus*. Usually 1 small and blunt spine above dactylar cutting edge on dorsal surface. The large specimen from "Brummies" Ck bears 3 spines above dactylar cutting edge on its normal chela. 1 small to medium apical mesial dactylar spine (absent on one normal chela, and 2 spines on one regenerate chela). Other apical dactylar spines and dactylar basal spines absent. Dactylar groove absent or shallow. The dactylus is proportionally longer in the specimens from Mt Warning. Dactylar length/propodal length: 0.51–0.53 (Palmer Ck, "Brummies" Ck, North Wollumbin Rd gully); 0.62–0.66 (Mt Warning). —*Punctation*. As for *E. girurmulayn*. —*Setation*. Light on body, moderate on abdomen. Dense clumps of long, but uneven, setae protruding from punctures in chelae, especially on fingers. Distinctive bristly setation around and on lateral processes of pereiopods, and around coxa of pereiopods of some animals. —*Gastric Mill*. TAP count 3.0–3.5; TAA count 1.0–2.0; spread 1.5–2.5. Urocardiac ridges 3–6.

Colouration. Body dorsally brown to green-brown. Cephalothorax (and to a lesser extent abdomen) laterally lighter, often a rich golden-brown. Body ventrally pink and cream. Walking legs blue-grey. Carpus and propodus brown or green-brown dorsally and with a darker veining pattern (less distinct than in *E. girurmulayn*). Fingers bluish apically. Carpus, propodus and fingers variable in ventral colour: specimens from Mt Warning NP predominantly brown, with small and varying amounts of blue; specimens from Wollumbin NP predominantly blue with only minor brown wash across palm near dactylar articulation. Darker veining pattern evident on ventral propodal surface of all specimens.

Sexes. Males possess a cuticle partition. The female from Mt Warning (25.2 mm OCL) has soft, membranous gonopores with lightly setose margins. All other females (17.5–22.4 mm OCL) have calcified gonopores which lack setae. It would appear that female maturity occurs near 25 mm OCL.

Biology. *Euastacus guruhgi* occurs in rainforested gullies and streams draining the Tweed volcanic plug. Specimens were collected from under rocks and debris, and were found together with *E. sulcatus* at all sites. *Euastacus guruhgi* hosts small, white temnocephala.

Etymology. From the Bundjalung Aboriginal word *guruhgi* (swollen) (Sharpe, 1985), describing the inflated, swollen appearance of the sternal keel and lateral processes.

Euastacus jagabar n.sp.

Fig. 7

Type material. HOLOTYPE: AM P67933; ♀ (OCL 28.9 mm); a small tributary to Sheepstation Creek (rainforest), Border Ranges National Park, northeastern N.S.W.; 28°23.900'S 153°01.500'E (topographic map); elevation 430 m; J. Coughran and S. Waddington; 16 January 2002. PARATYPES: AM P67923; 2♀♀ (OCL 18.5, 23.5 mm); Sheepstation Creek (rainforest), Border Ranges NP; 28°24.546'S 153°01.462'E; elevation 330 m; J. Coughran; 17 October 2001. AM P67924; 1♂, 1♀ (OCL 18.8 mm, 19.3 mm); Sheepstation Creek (rainforest), Border Ranges NP; 28°24.546'S 153°01.462'E; elevation 330 m; J. Coughran; 5 December 2001. AM P67922; 1♀ (OCL 22.4 mm); type locality; J. Coughran and S. Waddington; 16 January 2002.

Type locality. The type locality is in a small gully adjoining the main tributary of Sheepstation Creek on the Rosewood Loop circuit, Border Ranges NP, approximately 25 km north of Kyogle. The stream connects with Sheepstation Ck below the falls.

Other specimens examined. A small male specimen (OCL 12.6 mm; SCU KCK.gd.16) retained on 16 January 2002 from a minor stream feeding Sheepstation Ck was also briefly examined.

Diagnosis. As for *E. girurmulayn*, except: Rostrum short, often not reaching base of third antennal segment. 2–3 small and rounded rostral spines, extending to rostral base. Antennal squame inflation very pronounced and at midlength, almost triangular in shape. Lateral cephalon poorly spinose, with only a few small, blunt bumps per side. Cervical spines absent. Li abdominal spines absent or present as 1–3 small and blunt bumps on somite 2, occasionally a slight bump on somites 3 and 4 also. 6–8 small dorsal meral spines. 1 dorsal apical propodal spine. Dactylar groove shallow. Keel Pair 2 slightly apart. Keel Pair 3 deflated laterally and with moderate posterior margins.

Description. Maximum OCL: 28.9 mm. —*Rostrum*. Rostrum short, usually not reaching base of third antennal segment (just reaching on two specimens). Rostral carinae sides convergent and bases divergent. 2–3 small, rounded rostral marginal spines per side, with a distinct gap between first and second spines. Acumen similar in size to marginal spines. Rostral carinae short. OCL/carapace length: 0.87–0.89. Rostral width/OCL: 0.15–0.18. —*Cephalon*. A few small or barely discernible, blunt cephalic spines per side. First postorbital spine medium and blunt. Second postorbital spine absent. Basipodite spines absent, holotype with 1 medium and blunt spine on one side. Coxopodite spines small to medium in size and blunt. Interantennal scale elongate (broad on one specimen). Holotype bears a small spine in the centre of the scale, giving the impression of a second broad scale overlying the true scale. Scale margins smooth. Suborbital spine small to medium. Antennal squame lacking marginal spines and inflated at or slightly posterior to midlength, with inflation appearing almost triangular in shape. Interantennal scale length/OCL: 0.06–0.09. —*Thorax*. Cervical and thoracic spines absent. General tubercles small and moderate to dense. Areola incurved at centre. Areola length/OCL: 0.34–0.38. Areola width/OCL: 0.18–0.19. Carapace width/OCL: 0.48–0.52. Carapace depth/OCL: 0.45–0.47. —*Abdomen*. Li abdominal spines either absent or present as 1–3 barely discernible bumps or small and blunt spines on abdominal somite 2. Holotype with 1 barely discernible bump on somites 3 and 4. When present, Li spines and bumps often discernible mainly by blue colouration. Lii, D-L and D spines absent. Abdomen width/OCL: 0.44–0.46. OCL/total length: 0.41–0.43. —*Tailfan*. Standard tailfan spines highly variable, absent or small to medium. Telsonic and uropodal surface and marginal spines absent. Telson length/OCL: 0.3–0.36. —*Keel*. Pair 1 usually close, slightly apart on paratype, and parallel. Pair 2 slightly apart and parallel to open. Pair 3 narrow to medium breadth, deflated laterally and with moderate posterior margins (i.e. not elongate posteriorly). Pair 4 broad. Keel between pairs 3 and 4 moderate in development. Lateral processes with well-defined margins. —*Chelae*. Intermediate to stout, paratype with an elongate regenerate chela. *Merus*. 6–8 small to medium, blunt spines. *Carpus*. 4 mesial carpal spines, first (distalmost)

and third spines offset ventrally to second and fourth. Ventral carpal spine small to medium (absent on one specimen), and blunt. 1–4 small to medium and blunt ventromesial carpal spines, and 1 large ventromesial carpal spine immediately ventral to carpal spines (this large and moderate ventromesial carpal spine is much larger than ventral spine, being similar in size to the mesial carpal spines). Lateral carpal spines absent or insignificant, and discernible mainly by colour. Dorsal carpal spines absent. Dorsal carpal groove deep. *Propodus*. Dorsal lateral propodal spine row extending from apex to as far as ⅔ of propodal length (to around midlength on most specimens). Ventrolateral propodal spine row absent. 4 mesial propodal spines, with a distinct gap between first (at distal edge of propodal palm) and second spines. 1 small spine and occasionally some irregular bumps and punctations lateral to dactylar base dorsally. 1 barely discernible to small spine lateral to dactylar base ventrally. 1 small dorsal apical propodal spine on most specimens, holotype with an extra barely discernible spine on one chela only, paratype with an extra barely discernible spine on both chelae. 2 large, blunt bumps at dactylar articulation dorsally. Spines posterior to dactylar articulation absent. Precarpal spines absent. Spines above propodal cutting edge (dorsal surface) absent (1 barely discernible spine on one chela of holotype). Propodal length/OCL: 0.77–0.9. Propodal width/propodal length: 0.43–0.48. Propodal depth/propodal length: 0.29–0.33. *Dactylus*. 1 small, blunt spine above dactylar cutting edge on dorsal surface. 1 small to medium and blunt apical mesial dactylar spine. Other apical dactylar spines and dactylar basal spines absent. Dactylar groove present. Dactylar length/propodal length: 0.53–0.56. —*Punctation*. As for *E. girurmulayn*. —*Setation*. Sparse on body, moderate on abdomen. Dense clumps of long, but uneven, setae protruding from punctures in chelae, especially on fingers. Distinctive bristly setation around and on lateral processes of pereiopods, and around coxa of pereiopods on some animals. —*Gastric Mill*. TAP count 3.0–3.5; TAA count 1.0; spread 2.0–2.5. Urocardiac ridges 4.

Colouration. Body dorsally varying from rich tan-brown to dark blue-black, tending to deep green-brown, green-blue or blue on cephalon. Lateral branchiostegites usually paler and tan brown. Small patches of blue in between abdominal pleura and between thorax and abdomen (on first abdominal somite). Prominent, royal blue patches on lateral cephalon above anterior end of cervical groove ("cheek spots"). Body ventrally cream, lavender and/or blue. Walking legs lavender to blue, with pale pink-white coxa. Third, fourth and fifth lateral processes of pereiopods blue to lavender. Carpus and propodus ranging from tan and green to blue-black dorsally. Carpus ventrally with a pink to blue base, tinged green mesially and brown laterally. Apical half of propodal finger pale blue, to a lesser extent on dactylar finger also. Propodus ventrally pale pink to blue, with a deeper blue veining pattern, orange-brown or green-brown across dactylar articulation and ventrolaterally along propodal finger. Apical ⅔ of both fingers blue ventrally.

Sexes. Males possess a cuticle partition. When examined under the dissecting scope, the only male specimen caught was found to have thick strands of gelatinous material extruding from the gonopores, suggesting that he was mature. This specimen had an OCL of 18.8 mm. This would appear, therefore, to be a very small species of crayfish.

Fig. 7. *Euastacus jagabar*. Dorsal view, holotype, AM P67933. Photograph: Max Egan. Scale bar is 10 mm.

However, small "precocious" males have been described in *Euastacus* (Turvey & Merrick, 1997), and this specimen may also represent a similar case. The female holotype (28.9 mm OCL) differs only marginally in relative abdomen width to all other specimens, and has only minor setal development around the gonopores, which are still calcified. All other females (18.5–23.5 mm) have closed gonopores lacking setae. Thus, an onset of maturity near 30 mm OCL, at least in females, would seem likely.

Biology. The species occurs in shallow areas at the water's edge in minor tributaries, sidestreams and shallow edge habitat of Sheepstation Creek, immediately upstream of the falls, and in a major tributary. Sampling activities directly upstream, in the Sheepstation Creek Flora Reserve, yielded only specimens of *E. dalagarbe* and *E. sulcatus*. *Euastacus jagabar* is sympatric with *E. sulcatus*, a much larger and spinier species. It is likely that the two species partition the stream habitat, with the larger species inhabiting the deeper water in addition to the shallow areas, and the much smaller *E. jagabar* being restricted to shallower habitat throughout its life-cycle.

Etymology. From the Bundjalung Aboriginal language, *jagabar* is the same word used to describe blue, black, blue-black and dark (Sharpe, 1985), all of which are true of this species.

Discussion

Were it not for a slightly increased development of the abdominal and ventrolateral propodal spines and a regular ventromesial carpal spination, *Euastacus dalagarbe* would be placed within the *setosus* complex itself. Of the species outside the complex, it is perhaps most similar to *E. mirangudjin*, and notably so in colour. *Euastacus dalagarbe* is readily distinguished from *E. mirangudjin* in that the latter has greatly increased spination above the dactylar and propodal cutting edges. *Euastacus mirangudjin* can be further distinguished in that it has a row of well-developed spines ventral to the propodal cutting edges (i.e. on the underside of the chelae), a feature absent in all other poorly spinose species examined herein. Unlike *E. mirangudjin*, the propodal palm lateral to the dactylar base is distinctly smooth in *E. dalagarbe*, and the propodal fingers with fewer apical spines. The lateral processes of the fifth pereiopods are different between the two species. In *E. mirangudjin* the processes are fused together at the base and concave in profile, forming a distinct cup-shaped depression, and the posterior margins are fringed with long setae that terminates posteriorly in a mat of long setae. In *E. dalagarbe* the processes are not fused and lack the distinct depression, being strongly convex in profile. In addition, the posterior margins of the processes are not fringed with setae, and the terminal mat of setae is distinctly shorter, in *E. dalagarbe*.

Field sampling has not revealed any geographically or morphologically intermediate species between *E. mirangudjin* and *E. dalagarbe*, and although each species has been recorded from several sites they are each morphologically uniform across their known ranges. *Euastacus mirangudjin* occurs on the Richmond Range, and *Euastacus dalagarbe* on the Tweed Range. The only species recorded during the study in between these areas are the much larger and spinier *E. sulcatus* and *E. valentulus*. Although both *E. dalagarbe* and *E. mirangudjin* are somewhat similar to *E. reductus* (from the Port Macquarie region), morphologically *E. dalagarbe* is distinctly more similar to the *setosus* complex animals.

Largely because they lack many of the features integral to the taxonomy of the genus (i.e. spines), the geographically distinct taxa *E. girurmulayn, E. guruhgi* and *E. jagabar* are rather similar in general appearance. However, they differ in morphology of the sternum, antennal squame, dactylus and coxopodal plate (Table 1, Figs. 8–9). The antennal squame character is of particular interest. Morgan (1988) found variation in squamal shape between species in the *setosus* complex, and accordingly dismissed it as a generically diagnostic character. The enormous variation within the present species is also supportive of this.

In addition to those features listed in the table, other minor differences are evident. Specimens of *E. guruhgi* and *E. jagabar* have distinctly incurved areolar grooves (i.e. hour-glass shaped), with a row of large punctations mesial to each groove. These punctations are distinctly larger than the general punctations, and sprout setae which is longer and clumped (i.e. two or three setae per punctation). In contrast, *E. girurmulayn* animals have only moderately incurved or parallel areolar grooves, and exhibit poor development of the large pores. The ventral ear of the zygocardiac ossicle differs in *E. guruhgi* in that it is pronounced anteriorly and very uneven (jagged) posteriorly. However, general development of both the ear and the ossicle has been found to be inconsistent in some specimens of both *E. girurmulayn* and *E. guruhgi*, with a striking lack of bilateral symmetry in some animals. The taxa also differ

Table 1. Morphological features distinguishing the three species *Euastacus girurmulayn* (Nightcap Range), *E. guruhgi* (Tweed volcanic plug) and *E. jagabar* (Border Ranges). The species also differ in colouration.

feature	*Euastacus girurmulayn*	*Euastacus guruhgi*	*Euastacus jagabar*
antennal squame	narrow inflation	narrow to moderate inflation, slightly reduced on left hand side of some animals	very broadly inflated at midlength, almost triangular in shape
coxopodite antennal spines	irregular, either a broad zone of sharp spines or two large triangular teeth	irregular, either a broad zone of sharp spines or two large triangular teeth	regular, small to medium and rounded
lateral processes of pereiopods	sharply defined margins	blunt margins	moderate to sharply defined margins
lateral processes of Pr2	close	slightly apart to apart	slightly apart to apart
lateral processes of Pr3	intermediate to elongate posteriorly; not deflated	elongate posteriorly; not deflated	abrupt posteriorly; deflated laterally
lateral processes of Pr3 & Pr4	defined from keel	poor definition from keel; swollen appearance	defined from keel
sternal keel between pereiopods 3 and 4	deflated laterally, forming a narrow ridge, and shallow	broad and deep, and fused smoothly with lateral processes of Pr3 & Pr4	moderate in development
dactylar groove	distinct	absent or shallow	shallow
merus (dorsal spines)	7–12 spines	4–8 spines	6–8 spines

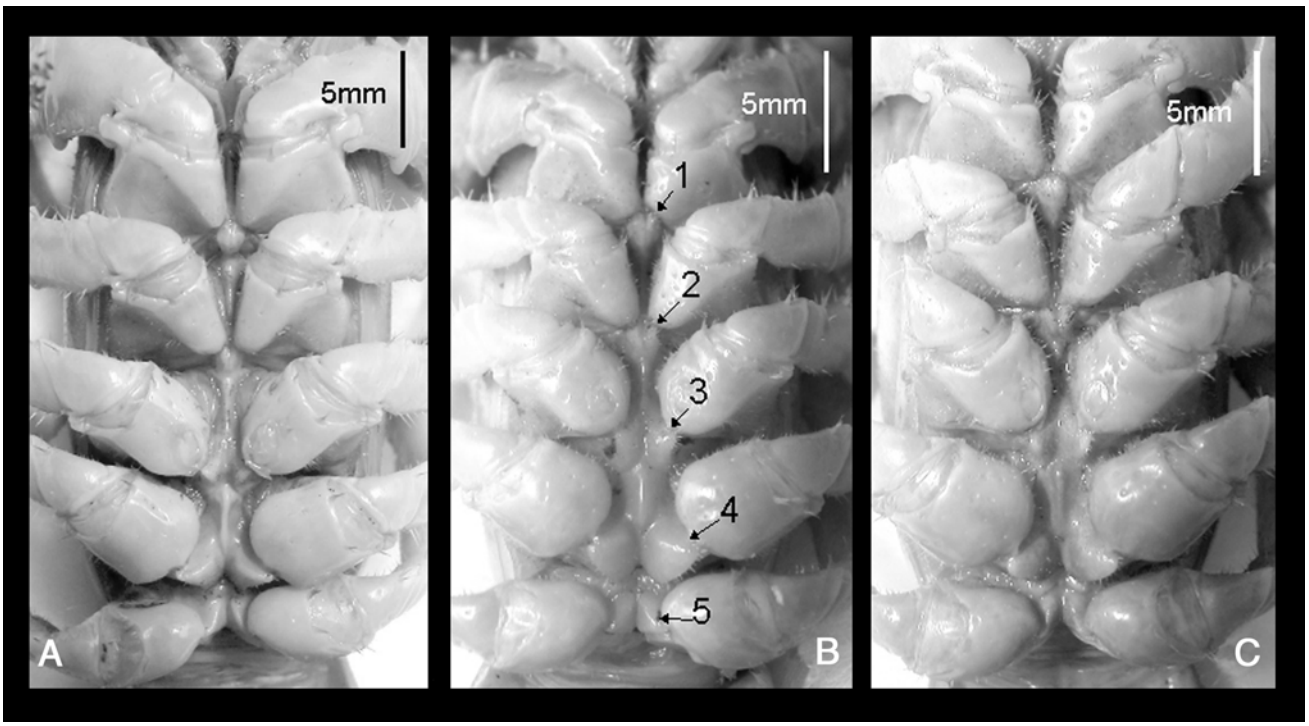


Fig. 8. Distinguishing features of the sternal keels and lateral processes to the pereiopods in the three species *Euastacus girurmulayn, E. guruhgi* and *E. jagabar*. Lateral process pairs (LPr1–5) are numbered in the centre image. (*A*) *Euastacus girurmulayn* has close and parallel LPr2, a deflated keel between the LPr3 and LPr4, and well-defined margins to the keel and processes. (*B*) *Euastacus guruhgi* has slightly apart to apart and open LPr2, very gradual posterior margins in the LPr3, a broad and deep keel between the LPr3 and LPr4, and blunt margins to the keel and processes. (*C*) *Euastacus jagabar* has slightly apart to apart and open LPr2, laterally deflated LPr3, moderate development of the keel between the LPr3 and LPr4, and moderate development and margins to the keel and processes. Photographs are of holotypes (AM P67914; AM P67926; AM P67933).

in colouration, and the veining pattern on the chelae is distinctly more pronounced in *E. girurmulayn*. There may also be differences in size at sexual maturity, at least in females. Females of *E. girurmulayn* and *E. jagabar* near 30 mm OCL bear immature gonopore characters, yet, at just over 25 mm OCL, the largest female *E. guruhgi* bears mature gonopores.

Of particular interest in the *E. girurmulayn, E. guruhgi* and *E. jagabar* taxa is the large spine immediately ventral to the mesial carpal spine row, a feature which is invariable across all specimens of all species. It differs, however, on the holotypes of the remaining members of the complex. There are no similar spines on *E. setosus, E. urospinosus* or *E. jagara*. A similarly large spine is present in *E. maidae*, but in a distinctly more ventral position. *Euastacus maidae* does, however, bear a considerably smaller spine posteromesial to this spine, located immediately ventral to the mesial row between the second and third spines. Thus, although different in nature to that of *E. girurmulayn, E. guruhgi* and *E. jagabar, E. maidae* also bears a ventromesial carpal spine immediately ventral to the mesial spine row. Morgan (1988) considered a large "mesoventral" carpal spine on *E. fleckeri* and *E. robertsi* (from far northern Queensland) as being one of several traits differentiating those species from the rest of *Euastacus*. If these distinctive carpal spines on either *E. maidae* or the present species are homologous with the mesoventral spine on the "*fleckeri* complex", a most interesting link is provided which may be of importance to our understanding of that complex too.

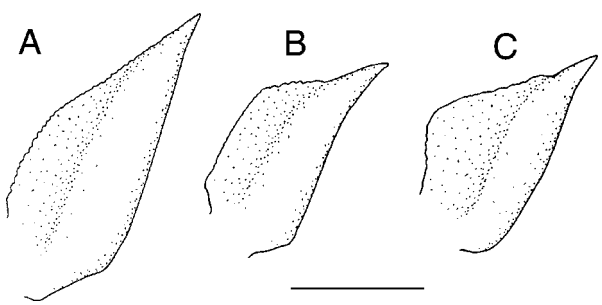


Fig. 9. Comparison of antennal squame: (*A*) *Euastacus girurmulayn*, holotype, AM P67914; (*B*) *E. guruhgi*, holotype, AM P67926; and, (*C*) *E. jagabar*, holotype, AM P67933. Scale bar represents 2 mm. Sketches: Shane Ahyong.

All of the presently described taxa can be differentiated from *E. sulcatus*, with which they are all sympatric, by the absence of the ventrolateral propodal spine row and the presence of three to four mesial carpal spines. *Euastacus girurmulayn, E. guruhgi* and *E. jagabar* can be further distinguished by the large ventromesial carpal spine immediately ventral to the carpal spines. *Euastacus sulcatus* is also much more spinose generally. Unlike the new taxa, small (and large) specimens of *E. sulcatus* usually bear considerable armature in the suborbital, postorbital, and cervical spine positions, and have much larger eyes relative to the body size (in comparably sized specimens). The following key has been adapted from those provided by Morgan (1986, 1997) to facilitate identification of *Euastacus* from northeastern New South Wales and southeastern Queensland.

Preliminary key to the species of *Euastacus* found in northeastern New South Wales and southeastern Queensland

Thoracic spines may be small, blunt, and visible only with strong lighting. They are best observed in animals over 20 mm OCL. Recently collected specimens of an undescribed *Euastacus* species allied to the larger, spiny species group are included in the following key as *Euastacus* sp. 1.

1 Ventrolateral propodal spine usually well developed, with 4 or more spines. Either thoracic spines or dactylar basal spines present. Animals >30 mm OCL with medium to large abdominal spines 2

—— Ventrolateral propodal spine row poorly developed, with fewer than four spines, or absent. Thoracic and dactylar basal spines absent (if thoracic spines present, then only as 1–3 spines just posterior to cervical spines). Abdominal spination poorly developed 7

2(1) Thoracic spines absent ..... *Euastacus sulcatus*

—— Thoracic spines present 3

3(2) Lateral spines present on outer ramus of uropod. Distribution north of Brisbane (Conondale Ranges area) ..... *Euastacus hystricosus*

—— Lateral uropodal spines absent. Distribution south of Brisbane 4

4(3) Dactylar basal spines usually present. Distribution west of the Clarence River 5

—— Dactylar basal spines usually absent (occasionally present on regenerate chelae, or on one chela only). Distribution east of the Clarence River 6

5(4) Telsonic surface spines present on animals >40 mm OCL. Thoracic spines yellow, orange or red. Rostral marginal spines usually apical or extending to midlength of rostrum. Setation light to moderate ..... *Euastacus suttoni*

—— Telsonic surface spines absent. Thoracic spines dark brown. Rostral marginal spines usually extending to base of rostrum. Setation heavy ..... *Euastacus* sp. 1

6(4) Thoracic spines large. 3 or 4 apical mesial dactylar spines. Ventral colour of propodus blue ..... *Euastacus valentulus*

—— Thoracic spines small to medium. 1 or 2 apical mesial dactylar spines. Ventral colour of propodus orange ..... *Euastacus gumar*

7(1) Spines above propodal cutting edge and dactylar cutting edge usually extending over more than ½ of chela gape, often spanning the entire length of gape (especially on propodus). A row of spines also present ventral to the propodal cutting edge (i.e. on the ventral surface of the chelae) ..... *Euastacus mirangudjin*

—— Spines above propodal and dactylar cutting edges usually absent, or, if present, only 1–3 apical spines. Spines ventral to propodal cutting edge absent 8

8(7) Usually a single ventromesial carpal spine present. Ventral carpal spine distinctly larger than ventromesial carpal spines ..... *Euastacus dalagarbe*

—— More than one ventromesial carpal spine, some of which distinctly larger than ventral carpal spine 9

9(8) The most mesial of the ventromesial carpal spines not located immediately ventral to the second mesial carpal spine 10

—— The most mesial of the ventromesial carpals spines distinctly the largest, and located immediately ventral to the second mesial carpal spine, to which it is of similar size (or larger) 13

10(9) Suborbital spine large to very large ..... *Euastacus setosus*

—— Suborbital spine small to medium 11

11(10) 6–7 mesial carpal spines ..... *Euastacus jagara*
—— 4 mesial carpal spines 12

12(11) Distalmost mesial carpal spine much smaller than other spines ..... *Euastacus urospinosus*
—— Distalmost mesial carpal spine largest ..... *Euastacus maidae*

13(9) Dactylar groove distinct. Lateral processes of the second pereiopods close. Sternal keel usually deflated between pereiopods 3 and 4, forming a narrow ridge. 7–12 dorsal meral spines ..... *Euastacus girurmulayn*
—— Dactylar groove shallow. Lateral processes of the second pereiopods slightly apart or apart. Sternal keel not deflated between pereiopods 3 and 4. 4–8 dorsal meral spines 14

14(13) Sternal keel broad and deep, and fused smoothly with lateral processes of third and fourth pereiopods, giving a swollen appearance. Lateral processes to the pereiopods with very blunt margins. Antennal squame inflation moderate ..... *Euastacus guruhgi*
—— Sternal keel moderately developed, and not fused with lateral processes of third and fourth pereiopods. Lateral processes to the pereiopods with well-defined margins. Antennal squame inflation pronounced, almost triangular in shape ..... *Euastacus jagabar*

Systematics

Euastacus dalagarbe belongs to a growing number of species bearing intermediary traits between the *setosus* complex and those of more characteristically spinose *Euastacus*. The species lacks a ventrolateral propodal spine row, has poor abdominal spination, and is poorly spinose around the thorax, cephalon and chelae generally. *Euastacus girurmulayn, E. guruhgi* and *E. jagabar* belong within the complex and are most similar to *E. maidae*, differing chiefly in ventromesial carpal spination. In addition, *E. maidae* differs in having more developed cephalic, cervical, post-orbital, abdominal and meral spination generally, more elongate carpal spines, and a serrate margin to the interantennal scale. *Euastacus girurmulayn, E. guruhgi* and *E. jagabar* could be considered as the least spinose members of the "spiny crayfish" genus *Euastacus*.

The discovery of another intermediary species, *E. dalagarbe*, further strengthens the synonymy of *Euastacoides* with *Euastacus* (Morgan, 1988), particularly so given that it is much closer to the complex itself than the remaining species in the intermediary group. It is also noteworthy that the distribution of a member of the *setosus* complex, *E. jagabar*, is in such close proximity to the distribution of *Euastacus dalagarbe*, a species bearing intermediary traits. As such, the southern end of the general distribution of the *setosus* complex as a whole (southeastern Queensland and northeastern New South Wales) now coincides with the northern end of the distribution of known species displaying intermediary traits. This is most interesting for our overall understanding of the *setosus* complex, which appears to be considerably larger and more widespread than previously thought. There are many gaps in the geographic distributions of species in both the complex and the intermediary group. It is quite likely that further research in Queensland and New South Wales will reveal more currently undescribed species which further add to our understanding of these small, poorly spinose *Euastacus*.

An unusual crayfish specimen (SCU.KCK.gd.15; male; 21.8 mm OCL; Fig. 10) has been collected from a site proximal to the type locality of *E. dalagarbe* during this study. The animal bears a number of traits of *Euastacus*, such as lateral propodal spines (weakly developed), a membranous posterior to the telson and simple genital papillae. However, the cephalothorax is strongly compressed and very deep, the abdomen is depressed, and the branchiostegal groove does not immediately fuse with the cervical groove on one side. The coxae of the pereiopods are more pronounced in development, and both the body and pereiopods are distinctly elongate. There is an unusually large gap between the rostrum and the antennae, and the antennal squame are long and quite odd in shape. It is conceivable that the specimen is a hybrid between *E. dalagarbe* and *E. sulcatus*, although this would not explain why it bears such significant features that are uncommon to both. In the absence of any further material it is not possible to resolve this issue at present. However, it may be of importance in the broader systematics of the Parastacidae, and efforts to collect further specimens would be highly desirable. Unfortunately, I have been unable to obtain further specimens despite repeated attempts. The single specimen was caught at night under a rock in a tributary to Brindle Ck, during wet weather in October 2002.

Conservation Status. All the new taxa appear to have restricted distributions. Much attention has been directed towards the conservation status of Australian freshwater crayfishes in recent years (Horwitz, 1990, 1995; Merrick, 1993, 1995; Morgan, 1997), and the genus *Euastacus* is perhaps the most threatened, with over one third of the species warranting conservation attention (see Horwitz, 1995). The upland *Euastacus* species, confined to remnant natural vegetation in highland areas, are threatened by habitat loss and fragmentation (Horwitz, 1990). Despite the fact that all of the present species occur in national parks, the uncertainty of their conservation status should be viewed as a concern. Although national parks are not reserved solely for conservation purposes (National Parks & Wildlife Service, 2001), the discovery of new species should be viewed as a significant increase to the conservation value of all parks in this study. The recent designation of the prior Whian Whian and Wollumbin State Forests as National Parks may be significant to the survival of *E. girurmulayn* and *E. guruhgi*, respectively.

Fig. 10. Lateral and dorsal comparisons of two similar sized specimens of: (*A–B*) the unusual specimen from Brindle Creek, and (*C–D*) *Euastacus dalagarbe*. The unusual specimen has a more elongate body, with a deeper, compressed cephalothorax and a depressed abdomen. The coxae and pereiopods are more pronounced in development, and the pereiopods more elongate. Scale bar represents 5 mm. Photographs: Max Egan.

It is conceivable that all of the presently described taxa are endemic to, and perhaps dependent on the remnant habitat provided by, these parks. However, even national parks are not exempt from anthropogenic influences, including the impacts from management, visitation and illegal activities. Poaching of crayfish from Brindle Creek (i.e. within the park and adjacent to the type locality for *E. dalagarbe*) has been observed during sampling in this study. In addition to being known from only small geographic areas, these species are found in very low abundance. This may be attributable to the presence of the much larger *E. sulcatus* at the type localities. Ecological research is required to ascertain the conservation status of *E. dalagarbe, E. girurmulayn, E. guruhgi* and *E. jagabar*.

ACKNOWLEDGMENTS. The sampling was part of a broader study on crayfishes supported by an Australian Postgraduate Award and supervised by Prof. Don Gartside. Additional research funds were provided by Southern Cross University and the Australian Geographic Society. Amy Coughran, Shawn Leckie, David Newell and Stephen Waddington assisted with field sampling. I owe many thanks to two anonymous reviewers and Drs Shane Ahyong and George Wilson (AM) for constructive advice and comments on the manuscript, Max Egan for providing the photographs as indicated in the captions, Dr Ahyong for the sketches, Maxine Dawes for assistance with preservation of voucher specimens, and Drs Penny Berents (AM) and Peter Davie (QM) for making available the comparative material. Sampling was conducted under permit from New South Wales Fisheries, State Forests of New South Wales and the National Parks and Wildlife Service.

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Associate Editor: S.T. Ahyong.

From: Dane Burke [redacted]
Sent: Sunday, 13 September 2020 8:19 AM
To: Records
Subject: No Dam!!

CYBER SECURITY WARNING – This message is from an external sender – be cautious, particularly with hyperlinks and/or attachments.

Dane Burke
[redacted]

To:
13th September 2020
Rous County Council,
Lismore NSW 2480

Dear Rous Councillors and General Manager
Re: The proposed Dunoon Dam within the Future Water Project 2060

Thank you for supporting the extension of the submission date. We also acknowledge the complexity
of what Rous does to provide water to our region.

I DO NOT support the proposed The Channon-Dunoon Dam for these reasons:

? Lost opportunity to invest in system-wide water efficiency - this is the cheapest & fastest way to ensure supply-demand balance. By focussing on system efficiency, Sydney added an additional 950,000 people without a rise in consumption. (Metropolitan Water Plan 2006, NSW Government)

? The 21st century is about a suite of smart water options. This dam would be a lost opportunity to make our system fit for the 21st century. It would swallow all resources in one big expensive 'white dinosaur' project.

? The dam would encourage continued inefficient and often wasteful water management by local governments. They would have no incentive to do things differently.

? Destruction of important Indigenous cultural heritage, including burial sites (Cultural Heritage Impact Assessment, 2011). Ongoing disregard for First Nations' heritage.

? Destruction of The Channon Gorge and its endangered ecological community of lowland rainforest (including regionally rare warm temperate rainforest on sandstone), and its threatened flora and fauna species. (Terrestrial Ecology Impact Assessment, 2011).
Rous is planning to offset the loss of rainforest on sandstone with regeneration of degraded land in the buffer zone. Offsetting is problematic because the type of vegetation offered as recompense is never equivalent. This example is worse than most. (Nan Nicholson, botanist)
Councils are required under State planning regulations to: "Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value." NSW Department of Planning, Industry and Environment 2019, 'Delivering the plan', Sydney, viewed 03 August 2020 < https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/North-Coast/Delivering-the-plan >, Direction 2: Enhance biodiversity coastal and aquatic habitats and water catchments.

Rous is required to avoid this destruction because there are economically viable and more effective solutions.

? Industrial/construction zone for The Channon/Dunoon community; noise, machinery, trucks, visual impact. Ongoing sound impact from pump house etc.

? Higher prices for consumers due to a 4x increase in the cost of water. Rous general manager, in response to a question from councillor Vanessa Ekins, said he expected a fourfold increase in the cost of supplying water if the dam is built.

? The small population increase predicted for the four Rous-supplied councils of 12,720 between 2020-2060 does not justify such a large and destructive dam. The dam risks being an expensive white dinosaur, diverting expenditure away from more sustainable, flexible and effective solutions. NSW Department of Planning, Industry and Environment 2019, 'NSW population projections ', Sydney, viewed 03 August 2020, <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projecti
ons> scroll down to "Local Government Factsheets".

? Catastrophic flooding downstream in worst floods, particularly for the first 3 kilometres below. (Environmental Flows Assessment 2011)

? Potential for a big dam to drive unneeded population growth, as the government attempts to gain value from an otherwise unnecessary, and stranded, asset.
I SUPPORT these alternatives:
I believe we need to take action on a suite of smart water options and proven alternatives. The tide is turning on renewable and sustainable power. It is time for the tide to turn on how we meet
our water needs too. This is 21st century thinking.

? An investment in system-wide water efficiency and strong demand management. Analysed, costed and deployed, creating jobs. (We understand Rous has not costed this in creating their future water plan)
Existing research over the past decade consistently finds that the best 'bang-for-buck' investment in water supply comes from demand management and identifying savings within the existing supply.

Professor Stuart White from UTS has provided a detailed and costed proposal "The Rous Sustainable Water Program" which shows exactly how and why system-wide optimisation of water use is possible and economical. In comparison, the proposed dam is simply financially, environmentally and socially irresponsible.
(Stuart White, 2020. www.bit.ly/Prof-Stuart-White-Rous-slides)

Prof Stuart White - Rous
Water RSWP slides
20200904.pdf
www.bit.ly

? Water re-use in various ways, including Purified Recycled Potable water.
A wealth of global research and experience already exists regarding potable reuse of water as set out in Water Research Australia's report, Potable Water Reuse: What can Australia learn from global experience?

https://www.waterra.com.au/publications/document-search/?download=1806

Example: The city of Windhoek in Namibia in Southern Africa has been using purified recycled water for 30 years using advanced technology. https://www.wingoc.com.na/our-history

? Water harvesting (urban runoff; rain tanks):
Water tanks on all new (and existing) developments.
This builds community resilience - much needed, as the recent extreme bushfire season has shown.
The Australian government advises that: “Depending on tank size and climate, mains water use can be reduced by up to 100%. This in turn can help: reduce the need for new dams or desalination plants; protect remaining environmental flows in rivers; reduce infrastructure operating costs.”
Rainwater harvesting also decreases stormwater runoff, thereby helping to reduce local flooding and scouring of creeks.

https://www.yourhome.gov.au/water/rainwater

? Contingency planning would enable Rous to be ready to rapidly implement supply measures if it becomes necessary in times of drought.

? Groundwater, where this is environmentally safe
The Australian government provides a lot of information on the ecological impacts and groundwater usage.

https://www.environment.gov.au/water/publications/what-are-the-ecological-impacts-of-ground
water-drawdown

With scalable supply alternatives in place, the existing supply from Rocky Ck Dam will be made resilient to anticipated times of drought and projected population growth, without the environmental
destruction, social costs, and the over-capitalisation risk of an outsized and unnecessary dam.

Rous Water Project 2060
Lennox Head Residents' Association (LHRA) Submission
13 September 2020

The Lennox Head Residents Association (LHRA) explicitly opposes the proposal that the Alstonville Aquifers and Dunoon Dam are long term solutions to the region's secure water supply.

Professor Stuart White's, Institute of Sustainable Futures, has already reported that the data and analysis does not support such a major investments.

As well, an EIS was needed to be completed first before opening the matter up for public input.

Yes Rous Water is responsible for the region's water supply however there are far more opportunities to manage demand than draining aquifers and building dams, flooding significant ecosystems and indigenous sites.

A productive and practical approach is a partnership between Rous Water (as water miners) and the LGA members (consumers) to address opportunities along the supply chain that will redefine water usages, reduce water usage, and use multiple water sources.

Apparently, this region is faring far better than other regions in using approx. 175 litres potable water per person when the goal is 160 litres per person per day. However, the region needs to implement sustainable solutions than aspiring to lower the potable water usage. Such as the differentiation between drinkable water and the water to wash clothes, flush toilets, commercial and industrial use and their sources.

This is not "re-inventing the wheel" because there are worldwide sustainable water managements in place whereby populations are increasing without increasing water usage.

Another layer of complexity is most LGAs' economies are highly reliant on tourism. This industry needs to be part of the solution instead of residents carrying the full responsibility for efforts to ensure a secure water supply.

In closing, LHRA does not support these proposals and asks that Rous Water and LGA members develop a partnership to create sustainable water management.

Thank you

Yours sincerely

[redacted]

Monica Wilcox

President, Lennox Head Residents' Association
for Lennox Head Residents' Association