



**Healthy Rivers Dubbo**  
**PO Box 216**  
**Dubbo NSW 2830**  
[heathyriversdubbo@gmail.com](mailto:heathyriversdubbo@gmail.com)  
ABN 11 988 241 202

Select Committee on Floodplain Harvesting  
NSW Parliament House  
6 Macquarie Street  
Sydney NSW 2000  
By email [floodplainharvesting@parliament.nsw.gov.au](mailto:floodplainharvesting@parliament.nsw.gov.au)

31<sup>st</sup> August 2021

## Submission

### Select Committee on Floodplain Harvesting

Healthy Rivers Dubbo (HRD) is a grass roots community network dedicated to providing a strong voice for our local rivers, aquifers and wetlands in the Murray-Darling Basin for the benefit of wildlife, plants and people. We pay our respects to Elders past and present, and acknowledge that this land was never ceded.

HRD is grateful for the opportunity to contribute to the Select Committee on Floodplain Harvesting (the inquiry). We wish to express our gratitude to all Representatives who were involved in the two disallowance motions of the Floodplain Harvesting (FPH) Policy regulations in the Upper House, and the establishment of this inquiry.

This submission will focus on the Macquarie Valley, and address the terms of reference thus:

#### 1. The legality of floodplain harvesting practices

*a) Floodplain harvesting in the Macquarie Valley and the 1994/95 Cap*

*b) Claim of 'over recovery'*

*c) Draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018*

#### 2. The water regulations published on 30 April 2021

*a) Modelling*

*b) Environmental Assessment of existing floodplain structures*

*c) Proposed Regulations*

#### 3. How floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan

*a) Environmental Condition of the Macquarie River and Marshes*

*b) Sustainable Diversion Limit, Environmentally Sustainable Level of Take and Specific Site Flow Indicators*

*c) Floodplain Harvesting in the Macquarie Valley landscape*

HRD presents the following recommendations to the committee for consideration:

**The legality of FPH practices:**

- 1. FPH diversions must be brought back to the 1993/94 level of development under the Murray-Darling Basin Cap agreement. In the Macquarie Valley, that means zero.**
- 2. The NSW Government outright reject the baseless and arbitrary claim of 'over recovery' in the Macquarie and Gwydir Valleys**
- 3. That the draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018 be gazetted ASAP after it is reviewed to ensure:**
  - **There's a clear process for identifying and removing illegal floodplain works that have an impact on critical flow paths.**
  - **There must be a description of the relationship between floodplain harvesting and managing floodplain structures.**
  - **The designated floodplain should not be expanded to provide eligibility to a greater number of floodplain works capable of diverting rainfall run off.**

**The Water Regulations published on 30<sup>th</sup> April 2021**

- 4. In valleys where FPH will be licenced (not the Macquarie), any FPH licences that are issued be provisional until such time as accurate metering is available and the correct volumes are known.**
- 5. That the NSW FPH regulations include the clause:**  
***"Eligible works engaged in or capable of floodplain harvesting activities and eligible applications for such works will undergo environmental review and be assessed to determine their capability to harvest floodplain water."***
- 6. That the proposed FPH regulations:**
  - have annual accounting with no "carryover"**
  - have an initial AWD of 1ML per unit share or less**
  - permanent trade be restricted to management zones as proposed**
  - no new approvals or modifications allowed that increase diversions**
  - prohibit FPH access until downstream flow targets are met**
  - active management rules to protect 100% of Held Environmental Water**
  - are extended to protect 100% of Active Environmental Water Allowance**

**How floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan**

- 7. The cumulative environmental impacts of decades of floodplain harvesting must be assessed before licences are issued.**
- 8. The Sustainable Diversion Limit in the Macquarie be reassessed to ensure it represents the Environmentally Sustainable Level of Take**
- 9. That particular scrutiny be paid to the environmental impact of floodplain works on critical flow paths such as Bulgera Creek**

## *1. The legality of floodplain harvesting practices*

HRD considers that FPH is an unlawful practice, and that Governments, Authorities and Agencies have turned a blind eye to the practice.

There are no legal levers between FPH policy and the water sharing priorities under the WMA (ss. 5(3) and 9(1)), which include water for ecosystem health and basic landholder rights (stock and domestic; native title rights).

The NSW Water Minister received internal legal advice that stated that on the balance of probabilities, taking water without an access licence is most likely unlawful. Building on-farm storages to house that illegally obtained water without the appropriate approvals would also be unlawful. This advice was withheld from the public until the Minister was urged in Parliament to release it.<sup>1</sup>

The irrigation industry has grown large and politically powerful in recent decades and in HRD's view has too much influence on water policy at every level. The extent of this wealth and power has come from the illegal take of water.

In many parts of the world through history and to the present day the textile industry has used slavery to grow large and powerful. Only the erosion of social licence through community advocacy can bring about justice for the Environment, First Nations Peoples and the wider community.

HRD will argue in section 1 that:

- Volumes of FPH to be licenced must be brought under the Cap, and that the Cap should not stretch to accommodate FPH volumes. In the Macquarie Valley that means zero FPH.
- The NSW Government is accommodating the irrigation industries arbitrary claim that environmental water in the Macquarie is 'over recovered'. A claim HRD rejects outright and presents evidence to show that 'over recovery' is not a thing.
- The draft Floodplain Management Plan 2018 must include clear process to ensure all illegal floodplain works are removed. The Floodplain Management Plan 2018 for the Macquarie is still not gazetted, which must happen ASAP.

### *a) Floodplain Harvesting in the Macquarie Valley and the 1994/95 Cap*

The NSW Government proposes to licence all FPH diversions in the Macquarie Valley at the current levels of diversion, returning no water back to the environment.

Healthy Rivers Dubbo does not accept that diversions in the Macquarie Valley are far enough under the cap that the full historic volumes of FPH diversions can be licenced.

The IQQM modelled estimate for FPH in the Macquarie Water Sharing Plan (WSP) is zero. FPH was not included in the 1994/95 cap on extraction, therefore no FPH can be licenced in the Macquarie.

The NSW Government are however proposing to increase the Sustainable Diversion Limit (SDL) to allow the full volume of FPH diversions to be licenced. There is a complete lack of transparency about how this can be achieved.

In documents seen by HRD, extraction in the Macquarie was almost at the SDL as of April 2020. The *Macquarie Priority Catchment Strategic Assessment*<sup>2</sup> and supporting documents were released to the

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<sup>1</sup> <https://www.abc.net.au/news/rural/2021-05-26/illegal-floodplain-harvesting-government-legal-advice-uncertain/100164210>

<sup>2</sup> [Macquarie Priority Catchment Strategic Assessment April 2020](#)

public through the NSW Parliament. This assessment looks at various build and non-build options to increase the volume of water that can be extracted from the Macquarie water source.

What stands out is that the estimated average diversions are stated to be 325.2 GL and the SDL is calculated to be 340.5 GL/year.

*"As a guide, applying the same % to source current conditions (with a total estimated diversion of 325.2 GL/a) gives an estimated SDL of  $325.2 / (1 - 0.045) = 340.5$  GL/yr.<sup>3</sup>"*

Which leaves a gap between diversions and the cap of 15.3GL, or 4.5%.

The tax payer funded department report goes on to detail the 'benefits' (from an extraction point of view) of three preferred options. The report states that option 2 (a re-regulating storage structure at Rocky Point) would increase general security reliability by 24,226GL P/A, which on its own would likely put diversions over the Sustainable Diversion Limit (SDL) by 5.2%.

Yet less than one year later, the NSW Government is saying that 52,537 GL P/A of FPH diversions, and 10,254 GL P/A of rainfall runoff/tailwater exemptions can be added to the total diversions and extraction will still be under the SDL.

The public has no confidence in the behind the scenes modification of the Cap, the SDL or the plan limit that the NSW Government is attempting.

The NSW Government and its agencies are attempting to lift the Baseline Diversion Limit (BDL) and the SDL to include the total historic volumes of FPH diversions. This cannot be allowed.

**Recommendation 1: FPH diversions must be brought back to the 1993/94 level of development under the Murray-Darling Basin Cap agreement. In the Macquarie Valley, that means zero.**

#### *b) Claim of 'over recovery'*

The NSW Government's assessment of FPH as fitting under the Plan Limit is accommodating the disputed claim being made by the irrigation industry that the environmental water holdings in the Macquarie (and the Gwydir) are 'over recovered' - a claim HRD strongly rejects.

The claim of 'over recovery' results from two processes:

- Changing the water recovery targets, and
- Changing the cap factors.

In the Macquarie there are two different water recovery targets, three different cap factors and no unifying formula for their use. It is possible using different combinations of figures to produce twelve different answers.

It is clear from Slattery and Johnson's *Water recovery and 'over recovery' in the Macquarie valley* report (submitted as [Appendix B](#)) that changes to cap factors and water recovery targets have not been based on science, but rather were intended to minimise water recovery.

*"The water recovery amounts are arbitrary. They have been changed by changing Cap factors, which was based on considerations such as the Minister's discretion, National Irrigators Council support for the Basin Plan, 'no disadvantage' to irrigators, but are not based on any science. Therefore, the*

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<sup>3</sup> [Macquarie Valley - Strategic Overview of source modelling Dec 2018](#). Page 23.

*difference between water recovery targets and water recovery amounts, so called 'over-recovery,' can also only be arbitrary."*<sup>4</sup>

**Recommendation 2: the NSW Government outright reject the baseless and arbitrary claim of 'over recovery' in the Macquarie and Gwydir Valleys.**

*c) The Draft Macquarie Floodplain Management Plan for the Macquarie Valley Floodplain 2018*

The FPH regulations that the NSW Government are proposing does not look at the approval status of existing works in the floodplain, nor does it seek to licence structures that are across natural waterways, as they are not deemed to be on a floodplain.

HRD was told in consultations with DPIE 'Healthy Floodplains' team members that this responsibility falls to the Floodplain Management Plan for the Macquarie.

One problem with that – the *Draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018* is yet to be gazetted.

The Gwydir Floodplain Management Plan had its five year review recently, and several issues were identified by environmental stakeholders. These issues would also be true for the Macquarie Plan, and must be considered before the Plan is gazetted.

- There must be a clear process for identifying and removing illegal floodplain works that have an impact on critical flow paths.
- There must be a description of the relationship between FPH and managing floodplain structures.
- The designated floodplain should not be expanded to provide eligibility to a greater number of floodplain works capable of diverting rainfall run off.

While it is very important that the above issues be addressed before the Floodplain Management Plan is gazetted, it is critical that the Plan is gazetted ASAP, as it highlights many problematic floodplain works.

One example of a natural water course that is heavily impacted by a structure is the Trangie Cowl.

When the Macquarie River floods, water breaks its bank at a low point called Rocky Point, southeast of Trangie, then spills into Trangie Cowl. Before irrigation development, water would make its way 88.9km northwest into the Beleringar Creek and back into the Macquarie River.

In 1968 a corporation blocked Trangie Cowl just upstream of the Trangie community, stopping all but the highest of natural flows from continuing downstream. The property was sold to another corporate agribusiness in 1976, who in 1992 constructed a large dam to the East of the Cowl with pumps and channels connected to the Cowl where it was blocked.

Once the on farm dam went in and water from the Cowl could be moved around the property and stored, very few flows made it over the embankment and through to the Cowl and beyond.

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<sup>4</sup> Slattery & Johnson 2021 (appendix B) page 9

Upstream of the corporate irrigation property on the Trangie Cowal, development of the Buddah Lakes for irrigation is now also impacting flows downstream, so much so that the agribusiness who blocked the Cowal is now getting a taste of its own medicine.

Downstream, properties that were once well watered and had unregulated irrigation licences found themselves without the reliable flows they have right to. Impacted landholders have shown incredible tenacity for thirty years contacting every relevant politician, government department and agency possible for an explanation as to why the works blocking a natural waterway are allowed to stand – with no satisfaction.

Downstream, the Goan Waterhole in the Trangie community is now dry more often than not. The waterhole is a very significant place for the Wongabon, Wiradjuri and Weyilwan People, and an important social and environmental asset for the Trangie community.

The draft *Floodplain Management Plan for the Macquarie Valley Floodplain 2018* classifies the Goan Waterhole as being in Management Zone D (MZ D) – special environmental and cultural protection areas.

MZ D is a special protection zone for areas of ecological and cultural significance. It includes floodplain assets that are highly flood-dependent and have a high ecological value or high cultural value as determined from consultation with the Aboriginal community. To ensure the ongoing and improved health and condition of these significant assets, only flood works of a minor nature can be approved in MZ D. Rules in MZ D aim to ensure that only flood works with a positive outcome for the asset or value can be built in the area. This will help maintain flood connectivity to significant floodplain assets. There are thirty MZ D areas covering 70,000 hectares or 6% of the floodplain.<sup>5</sup>

If the *Floodplain Management Plan for the Macquarie Valley Floodplain 2018* was gazetted, as it is well overdue to be, the works upstream of the Goan Waterhole would most likely need to be removed or significantly reduced.

**Recommendation 3: That the draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018 be gazetted ASAP after it is reviewed to ensure:**

- **There's a clear process for identifying and removing illegal floodplain works that have an impact on critical flow paths.**
- **There must be a description of the relationship between floodplain harvesting and managing floodplain structures.**
- **The designated floodplain should not be expanded to provide eligibility to a greater number of floodplain works capable of diverting rainfall run off.**

## *2. The water regulations published on 30 April 2021*

HRD has serious concerns about the lack of scientific integrity and transparency around the modelling used to inform the 30 April 2021 regulations. We assert that they are not fit for purpose.

The regulations must include a clause that requires the assessment of the environmental impacts of all works that are to be granted FPH licences.

We have included an extract from our April submission to the proposed water sharing plan rules that details our review of each element of the regulations.

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<sup>5</sup> Draft background document to the Floodplain Management Plan for the Macquarie Valley Floodplain 2018 page 76

While we maintain there must be no FPH licenced in the Macquarie, we offer recommendations 4, 5 and 6 as applying to other valleys where some (dramatically reduced) volumes of FPH may be licenced.

#### *a) Modelling*

HRD strongly believes that the modelling used to determine FPH shares in the Macquarie is not fit for purpose.

FPH licenced volume determinations will have a permanent detrimental impact on the environment, First Nations rights to water and basic landholder rights. The volume will also determine how large the wealth shift from the public purse to private and corporate hands will be when mortgageable, tradable, compensable licences are issued.

Climate change has not been factored in into the modelling, despite new robust climate/hydrologic datasets developed by DPIE last year for inclusion in the Regional Water Strategies (RWS). With these new datasets, DPIE has been able to come up with a 'base case' river system model.

The RWS states: *"just relying on our historical data to make water management decisions no longer represents the best course of action and that we have an opportunity to put plans in place to make sure we are prepared and resilient if there are future changes in the climate."*

Against its own advice, DPIE Water have omitted climate change from FPH models.

There is only a summary *Review of NSW Macquarie River Valley Model Build, Scenarios and Environmental Outcomes* report made available. Even the independent peer reviewers *Alluvium* only had access to reports, not the models themselves.

The Model Build Report identifies a lot of highly significant inaccuracies around the meters used to measure river diversions. There's a lack of real data on floodplain harvesting volumes, despite the FPH policy being in some form of development since 2008. In the Macquarie there's a +51% error rate/bias upstream of Narromine, which is extremely significant.

In the Macquarie Cudgegong there is 10,254 ML of water being considered for tailwater/rainfall runoff exemption. HRD does not trust the modelling used to come up with that volume. If this significant volume of water is not brought into the FPH licencing framework, it won't be counted towards the SDL. This form of take would not need to be measured, just monitored for assessment under the risk assessment in the Water Resource Plan. Any volume of rainfall runoff harvested above the 10% harvestable right must be licenced.

Return flows aren't assessed by the models used. The models' only function is to attempt to calculate floodwaters captured, not those that return to the river or floodplain environment. There's a strong chance water that returns to the river or stays on the floodplain is being assessed as FPH diverted volumes.

As stated by Alluvium: *"We note the statements in the report that the uncertainty in individual FPH take estimates (leading to entitlements) is still significant and measurement data is needed to improve on that."* This statement confirms that the inaccuracy of the volumes determined as eligible for FPH diversion are significantly incorrect.

For such a critical determination that will seal the fate of many people, much wildlife and an enormous amount of wealth to be dependent on the use of models that are not up to the job HRD considers to be a negligent act.

HRD reiterates that there should be no FPH licenced in the Macquarie Valley.

**Recommendation 4: In valleys where FPH will be licenced (not the Macquarie), any FPH licences that are issued be provisional until such time as accurate metering is available and the correct volumes are known.**

#### *b) Environmental Assessment of existing floodplain structures*

The proposed FPH policy being presented falls short in that it does not seek to identify and rectify the identified structures in the Macquarie floodplain that have no works approvals.

The 2010 draft FPH policy included the requirement:

*"Eligible works engaged in or capable of floodplain harvesting activities and eligible applications for such works will undergo environmental review and be assessed to determine their capability to harvest floodplain water."*<sup>6</sup>

The current FPH policy removes the requirement for environmental review.

As works approved under Parts 2 and 8 of the 1912 Water Act did not require any environmental assessment, it is critical that all works on the Macquarie floodplain be assessed for environmental impact. That requirement should be legislated in the FPH policy, as well as in the Floodplain Management Plan.

**Recommendation 5: That the NSW FPH policy include the clause:**

***"Eligible works engaged in or capable of floodplain harvesting activities and eligible applications for such works will undergo environmental review and be assessed to determine their capability to harvest floodplain water."***

#### *c) Proposed FPH regulations*

HRD offers the following comments on the proposed FPH rules, extracted from our submission to *Floodplain harvesting licence rules in the water sharing plans for the Macquarie Valley* dated 18<sup>th</sup> April 2021. We reiterate that there should be no FPH licenced in the Macquarie Valley, and that these rules therefore are only relevant to valleys where these would be some small volumes licenced.

#### 1. Account Management

**HRD strongly supports annual accounting for FPH with no "carryover"\***

HRD has heard DPIE Water trying to explain that the environment would be better off under 5 year accounting and 500% carryover and we strongly disagree.

DPIE Water is only looking backwards at flood behaviour up to 2009, when they know floods will change their patterns due to climate change. From the Macquarie Castlereagh RWS, the Valley can expect "reduced frequency of floods, but when they do occur, significantly higher flood flows throughout the entire region, particularly during the summer-autumn period."

And also from the same RWS:

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<sup>6</sup> NSW Office of Water, April 2010. NSW Floodplain Harvesting Policy. Draft for community consultation



*"just relying on our historical data to make water management decisions no longer represents the best course of action and that we have an opportunity to put plans in place to make sure we are prepared and resilient if there are future changes in the climate."*

HRD considers that under future conditions, 5 year with 500% "carryover"\* will lead to greater FPH diversions than 1 year accounting. We find it consistent with ICAC findings (that DPIE Water favours irrigators over First Nations rights to water and the environment) that DPIE Water are trying to tell us that the environment will be better off under 5 year accounting, when they are knowingly not using climate change predictions in their models.

*\*N.B. HRD rejects DPIE Water's use of the term "carryover" to describe entitlements for water that does not exist. HRD asks that DPIE Water come up with another term, such as credit accounting.*

## 2. Initial Available Water Determination

### **HRD strongly supports an initial AWD of 1ML per unit share or less**

Alluvium state in their letter reviewing the modelling reports that: *"We note the statements in the report that the uncertainty in individual FPH take estimates (leading to entitlements) is still significant and measurement data is needed to improve on that."*

DPIE Water know that the volumes licenced are significantly wrong, therefore the precautionary principle must be applied and an initial AWD of no more than 1 ML per unit share be allowed.

FPH diversions have been denying First Nations rights to water and the environment benefit from first flush flows (particularly sharply felt at the end of a drought) for decades. By granting irrigators a generous 500% hot start, DPIE Water are neglecting their legal obligations under the WMA 2000.

## 3. Permanent Trade

### **HRD fully supports that permanent trade be restricted to management zones as proposed**

While we would prefer FPH access licences not be tradable, we accept that it is a requirement under the Basin Plan that licences are tradable.

It is very important that trade be restricted as proposed:

- No new works located in management zones A or D as specified in the (as yet un-gazetted) Floodplain Management Plan for the Macquarie Valley Floodplain 2021.
- No modifications to works located in management zones A or D if the modification would result in an increase in capacity for that work.
- No new or modified works outside management zones A and D if the construction or modification would result in an increased rate of take for works located in management zone A or D.

## 4. Granting or amending water supply works nominated by a floodplain harvesting (regulated river) access licence

### **No new approvals or modifications that increase diversions**

HRD would prefer that DPIE Water were very clear that there can be no growth in FPH diversions, as we feel that is not the case through this consultation process.

HRD considers that:

- no new works approvals should be issued for FPH in the Macquarie Valley
- no modifications of existing FPH works should be allowed if the capacity of diversions would

- be increased
- only maintenance of existing FPH works should be allowed if the maintenance means there would be no increased diversion of water
- all licences works must allow floodwaters to pass without diversion or significantly slowing the flow for times when diversions are not permitted

## 5. Access Rules

### **HRD supports option 2 - prohibiting access until downstream flow targets are met.**

There are no clear, measurable protocols that DPIE Water can enact to ensure the priority of use provisions in the WMA 2000 are applied.

HRD recommends end of system flow targets be introduced in the Macquarie Cudgegong regulated WSP. Access rules for FPH in the WSP should specify that FPH diversion may occur only after modelling of a flow event shows that relevant flow targets will be achieved.

Flow targets must aim to achieve:

- Water sharing priorities under the WMA (ss. 5(3) and 9(1)), which include water for ecosystem health and basic landholder rights (stock and domestic; native title rights);
- Environmental needs based on NSW Long Term Watering Plans (LTWP) Environmental Water Requirements (EWR);
- Critical human water needs; and
- Cultural rights and objectives in addition to Native Title rights.

## 6. Active Management

### **HRD supports the use of active management rules to protect 100% of Held Environmental Water**

HRD supports the proposed use of active management rules to protect Held Environmental Water (HEW) from FPH diversion when HEW is being used to create an overbank flow in the management zone where active management applies.

However, the rules do not go far enough. HRD considers rules that protect 100% of HEW from diversion even when active management conditions are below 100% must be implemented.

HEW can be present in the system not just from planned releases from storages, but also under supplementary access. It is reasonable to expect supplementary HEW flows would be vulnerable to FPH diversion if the rules aren't there to protect it.

## 7. Environmental Flow Rules

### **Active management rules must be extended to protect 100% of Active Environmental Water Allowance**

Just as HEW can be used to create overbank flows in the Gum Cowal, Lower Macquarie Upstream and Lower Macquarie Downstream management zones, so too can environmental water allowance sub account 1 (active EWA).

Active EWA and HEW are managed together in the Macquarie Valley, therefore rules that protect HEW must also protect active EWA.

HRD recommends extending the active management application that protects HEW so that active EWA is also protected.

#### 8. Amendment provisions

### **HRD supports the proposed amendment provisions**

#### *3. How floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan*

HRD supports the licencing of FPH in NSW.

What we don't support are most of the regulations, any of the modelling, the poor consultation and the stretching of the Cap presented by the NSW Government.

For FPH to be sustainable, we first need to assess the cumulative environmental impact that FPH has had on the Environment over the last 30 years. Only then do we know the extent of the redress required.

Being honest about the environmental conditions in the Macquarie Valley is critically important. Unfortunately the irrigation industry and some National Party politicians are content to paint a picture that the Macquarie Marshes get too much water, and that the Macquarie River should not connect to the Barwon River. Both of these claims are outrageous and show bad faith.

#### *a) Environmental Condition Macquarie Valley*

The Ramsar Listed Marshes is one of the largest and most biologically diverse wetlands in the Murray Darling Basin.

The NSW and Commonwealth Governments has signed on to various international treaties and agreements, creating a legal as well as a moral obligation to protect the values of wetlands.

Some of the largest waterbird breeding events in Australia have occurred in the Marshes, where ample breeding and feeding habitat has been found.

The Marshes are referred to often as the kidneys of the river system. They have a very important role in absorbing, recycling and releasing nutrients. The nutrient rich environment provides conditions that support some of the highest densities of microinvertebrates reported anywhere in the world. These microinvertebrates form the basis of the food web for many larger animals.<sup>7</sup>

The Weyilwan People have complex custodial relationships with the Macquarie Marshes. Cultural values are related to specific trees, places, plants, animals and birds and the landscape as a whole.<sup>8</sup>

The Macquarie Marshes meet all five criteria used to work out if a site is a key environmental asset.

1. The water-dependent ecosystem is formally recognised in international agreements or, with environmental watering, is capable of supporting species listed in those agreements

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<sup>7</sup> Jenkins & Wolfenden 2006

<sup>8</sup> Macquarie Marshes Adaptive Environmental Management Plan - -Aust Govt Water for the Future 2012

2. The water-dependent ecosystem is natural or near-natural, rare or unique
3. The water-dependent ecosystem provides vital habitat
4. Water-dependent ecosystem that supports Commonwealth, state or territory listed threatened species or communities
5. The water-dependent ecosystem supports, or with environmental watering is capable of supporting, significant biodiversity

The Macquarie Marshes has been declining in size and character rapidly over the last several decades due to the increase of water take upstream. In 2010 at the end of the millennial drought, the Australian Government notified the Ramsar Convention of a likely change in ecological character.<sup>9</sup>

The reasons given for the notice are detailed in [Appendix A](#) of this submission.

HRD is often surprised at the certainty some people in the Mid Macquarie, upstream of the Macquarie Marshes, have in their claims on social media that they Marshes are over watered. Most times, people grow up hearing their peers saying these stories and believe them out of social allegiances. Sometimes, people who should know better like local Mayors, Councillors and even the local MP go on the record and in the media with claims the Marshes are overwatered.

The evidence that they are shrinking and that their character is at risk due to extraction upstream is overwhelming. There's no excuse to be saying otherwise.

Native Fish in the Macquarie have been doing it tough. In the drought the Macquarie was cut off at Warren, and we experienced catastrophic fish kills.

The Macquarie River catchment supports a number of threatened fish species including Silver perch *Bidyanus bidyanus* (vulnerable on IUCN Red List), Murray Cod *Maccullochella peelii* (vulnerable under Federal Environment Law (EPBC Act), freshwater catfish *Tandanus tandanus* (endangered population in Murray-Darling Basin NSW Fisheries Act).

The lower Macquarie catchment, including the Marshes, is located in the area covered by the endangered ecological community listed under the NSW Fisheries Management Act 1994 as the 'aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River'. This community covers all native fish and aquatic invertebrates and the natural rivers, creeks, lagoons, billabongs, wetlands, lakes, tributaries, anabranches and effluents in which they live.

The Environmental Protection Agency's Changes for Fish Condition index downgraded the Macquarie River from Very Poor in 2009-2011 to Extremely Poor in 2012-2014. Water extraction and altered flow regimes were listed first on the list of pressures causing the decline.<sup>10</sup>

Connectivity between the Macquarie and the Barwon Rivers is critically important for fish migration and nutrient transfer between valleys.

Uncle Badger Bates from Wilcannia told our Convenor that the Macquarie Marshes have always been very important to the Barkandji People, as plants from Weyilwan Country would arrive in flows and take root on the banks of their Baaka.

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<sup>9</sup> [Likely Change in Ecological Character of the Macquarie Marshes Ramsar Site Statement of Reasons Australian Government Dept of Environment Water Heritage and the Arts](#)

<sup>10</sup> <https://www.epa.nsw.gov.au/about-us/publications-and-reports/state-of-the-environment/state-of-the-environment-2015/17-river-health>

The Macquarie River has provided 21% of flows to the Barwon Darling over the long term.<sup>11</sup>

Unique in the Northern Basin, The Macquarie, Castlereagh and Bogan Rivers are winter and spring fed systems, and provide cool, filtered flows to the Barwon Darling-Baaka when flows from northern monsoon fed rivers recede. The reed beds in the Marshes perform an incredible service by cleaning the water that passes through.

Records show that the Macquarie connected to the Barwon (at a depth in the Lower Macquarie of at least 50cm) 9 years in 11 before Burrendong dam was built. Development of the valley means connection occurs 5 years in 11 now (as of 2017). Connections between major rivers represent important links for the movement of fish, transfer of energy, riverine biodiversity and providing a diverse aquatic habitat.<sup>12</sup>

Dr Martin Mallen-Cooper gave a talk in Dubbo in which he explains that even during the Federation drought, the Macquarie connected to the Barwon. [This eleven minute clip is well worth watching.](#)

It has been traumatic for environmental stakeholders in the Macquarie and the Darling Baaka to hear the NSW Water Minister in the Media saying that only 14% of water actually comes from those Northern Rivers into the Darling<sup>13</sup>. The CSIRO reported the figure is actually 99%<sup>14</sup>

Federal Member for Parkes Mark Coulton MP told members of HRD in 2017 that the Macquarie did not connect to the Barwon.

Constant messaging from the irrigation industry that the Macquarie is a terminal system will not make it so.

**Recommendation 7: the cumulative environmental impacts of decades of floodplain harvesting must be assessed before licences are issued.**

#### *b) Sustainable Diversion Limit, Environmentally Sustainable Level of Take and Specific Site Flow Indicators*

The SDL in the Macquarie is too high. It does not represent the volume of water that can be diverted and the environment be sustained.

The 'Assessment of environmental water requirements for the proposed Basin Plan: Macquarie Marshes'<sup>15</sup> was published by the MDBA in 2012 and contains the environmental assessment that was done in 2009.

The definition of what the SDL is and what it must do is stated on page 1 of the Assessment:

*The Water Act 2007 (Cwlth) established the Murray-Darling Basin Authority (MDBA) and tasked it with the preparation of a Basin Plan to provide for the integrated management of the Basin's water resources. One of the key requirements of the Basin Plan is to establish environmentally sustainable limits on the quantities of surface water that may be taken for consumptive use, termed Sustainable*

<sup>11</sup> Draft Macquarie Castlereagh Regional Water Strategy NSW DPIE

<sup>12</sup> [Making the Connection: Designing, delivering and monitoring flows between catchments](#) Davis, S., Asmus, M.W and Stocks, J.R. 2017

<sup>13</sup> various media interviews given in April 2021 when the Menindee gates were opened

<sup>14</sup> Water Availability in the Barwon-Darling. Summary of a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project. June 2008.

<sup>15</sup> [Assessment of environmental water requirements for the proposed Basin Plan: Macquarie Marshes - MDBA 2012](#)

*Diversion Limits (SDLs). SDLs are the maximum long-term annual average volumes of water that can be taken from the Basin and **they must represent an Environmentally Sustainable Level of Take (ESLT)**.*<sup>16</sup>

As described above, the conditions of the Macquarie Marshes in 2009 was very poor. Yet this was the year that the environmental watering needs of the Macquarie were assessed, therefore the SDL is not adequate to support a resilient or recovering Marsh.

Because FPH in the Macquarie was not included in the 1994/95 cap when the Murray Darling Basin Authority decided to reduce the water recovery target in the Northern Basin in 2018, all of the vast volumes of water that were diverted by FPH were modelled as going to the environment.

Specific Site Flow Indicators (SFIs) are the primary flow-to-ecology translation metrics that were used during the development of the Basin Plan and were then reapplied when water recovery targets were amended. In the Macquarie, there was no new science done to update the SFIs when they were reapplied.

The Murray Darling Basin Authority only uses four specific site flow indicators for determining the environmental requirements of the Macquarie Valley, while many of the other Northern Basin catchments have a greater number of targets.

The lack of a SFI for native fish in the Macquarie is having implications for the recovery of threatened species in this catchment. Connectivity between the Macquarie and the Barwon-Darling catchments is critical for the movement of fish to and from important breeding and habitat areas, and was not identified as a SFI.

While the SFI's were used as a justification for setting the SDL in the Macquarie high, the Murray Darling Basin Authority state in the 2020 Basin Plan Evaluation that performance against the SFIs has not been reported on. As flow-to-ecology translation metrics, the SFI's are so unreachable in real world conditions that the MDBA don't try to report on them.

The inadequacy of the SFIs in determining the environmental water needs of the valley means that there is now too much pressure on the existing portfolio of environmental water managed by NSW and the Commonwealth to service all of the environmental needs of the valley.

With water becoming scarcer, more is expected of the water that is managed for the environment than it can achieve.

While the MDBA should reassess the SFI's and the ESLT's in the Macquarie to ensure they are adequate to protect the environment, NSW has a role to play. In terms of FPH, NSW must assess the cumulative environmental impact that decades of FPH have had on the environment. This assessment must then inform a recalculation of the Sustainable Diversion Limit that is actually sustainable.

**Recommendation 8: the Sustainable Diversion Limit in the Macquarie be reassessed to ensure it represents the Environmentally Sustainable Level of Take.**

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<sup>16</sup> ibid - 1

### c) Floodplain Harvesting in the Macquarie Valley landscape

FPH in the Macquarie predominately occurs upstream of the Ramsar listed Macquarie Marshes. Figure 12 below shows the natural flow paths that direct water into the Marshes. Figure 10 below shows where the existing floodplain structures are.<sup>17</sup>

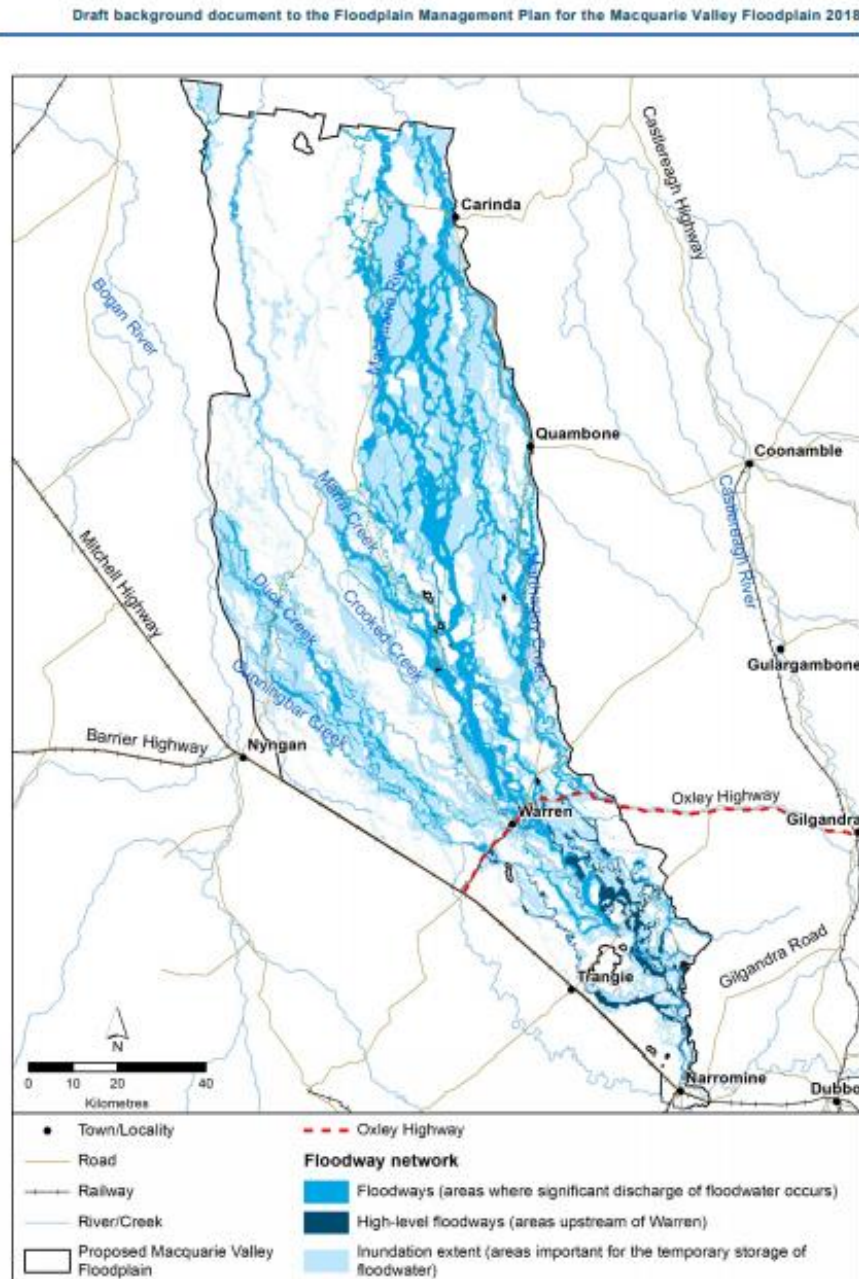


Figure 12: The proposed Macquarie floodway network

<sup>17</sup> Draft background document to the Floodplain Management Plan for the Macquarie Valley Floodplain 2018



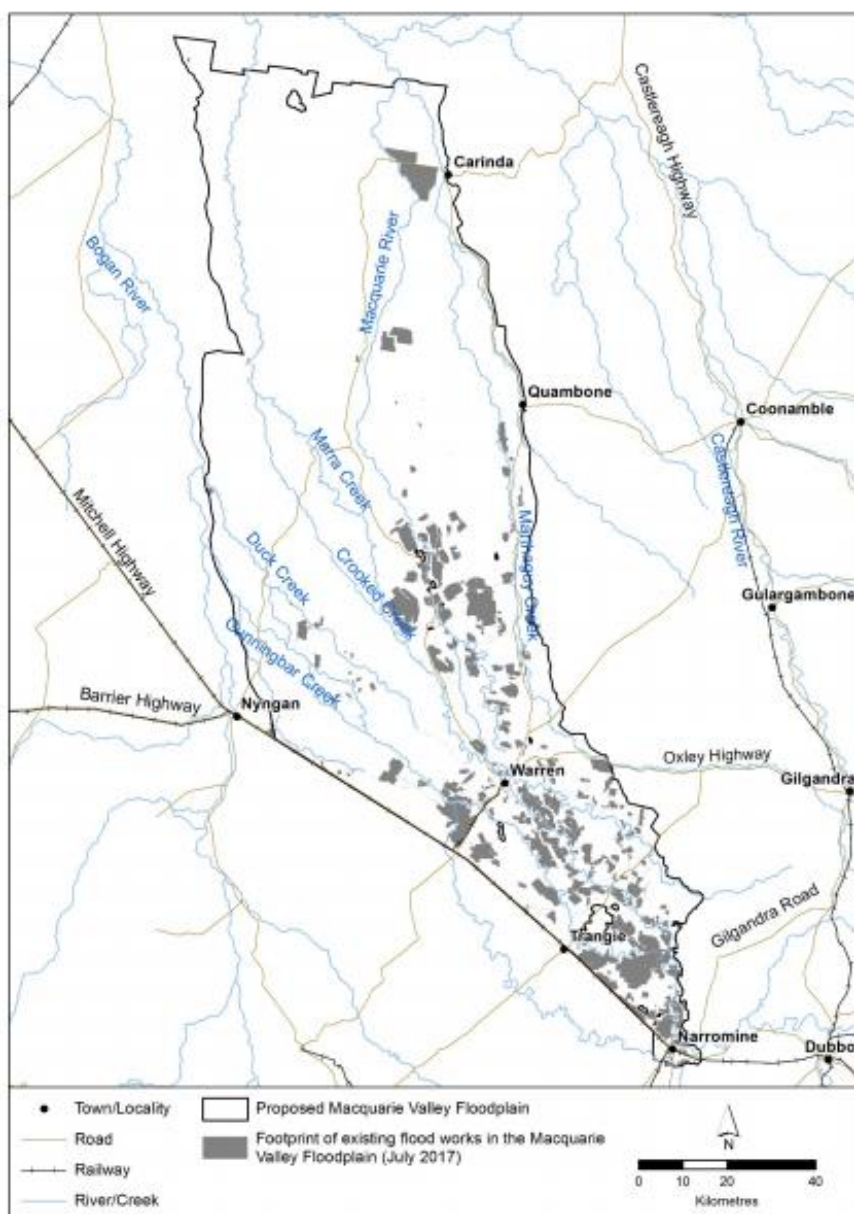


Figure 10: Overall footprint of constructed flood works

There is a concentration of floodplain harvesting structures in the three main inflow paths into the Macquarie Marshes, in particular Bulgeraga Creek near Mt Harris.

The impact of FPH in the Macquarie is amplified by where the concentration of activity occurs. Not only are the three main flow paths into the Macquarie Marshes congested with floodplain diversion works, but areas of groundwater recharge are also denied their natural recharge flows.

**Recommendation 9: that particular scrutiny be paid to the environmental impact of floodplain works on critical flow paths such as Bulgeraga Creek**



## Appendix A

### **Changes in flow regime**

- 1. Changes in flows into the Macquarie Marsh have been extensively studied over the past 15 years. Kingsford and Thomas (1995) reported that the flow between Dubbo and Warren and between Warren and Oxley Gauging Station has fallen markedly in the period 1944 to 1994. For example between 1944 and 1953 volume at Oxley was 51per cent of the flow through Dubbo. In the 1984 to 1993 period volume at Oxley was 21per cent of the flow through Dubbo. Kingsford and Thomas calculated that there was no significant difference in rainfall between the two decades.*
- 2. Inundation mapping of the Macquarie Marshes over the period 1979 to 2006 demonstrates a significant reduction in the frequency, extent and duration of low, medium and high inundation events.*
- 3. The area receiving high inundation frequency in the Macquarie Marshes has declined during this time by 57per cent in the northern section of the Macquarie Marshes Nature Reserve and by 95per cent in the southern section of the Macquarie Marshes Nature Reserve. Change in extent and condition of wetland vegetation communities in the southern section of the Macquarie Marshes Nature Reserve (MMNR)*
- 4. In 1981 large stands of reed of approximately 2000 ha were mapped in the South Marsh. In 1991 a very similar area of reed bed was again mapped. Further mapping found that change since 1991 in the southern section of the MMNR included a 95per cent reduction in the area of common reed from 1207 ha to 67 ha.*
- 5. Water couch forms extensive grasslands in the Marshes as well as being an important understorey plant in woodland areas. Vegetation mapping in 2008 found no water couch remaining in the southern section of the MMNR, revealing a loss of 220 ha since 1991.*
- 6. Authors of vegetation mapping in the southern section of the MMNR found 'catastrophic' change since 1991 with the loss of 95per cent of semi-permanent wetland vegetation (reeds, cumbungi and water couch), a decline in the condition of river red gum, coolibah and black box communities and a 100per cent loss of grassland communities. There had been some increases in the area of black box in the southern section of the MMNR since 1991 but the condition of these woodlands had changed with most now classified as black box woodland/chenopod shrubland. Chenopod shrubland now covers 80per cent of the southern section of the MMNR.*

### **Change in extent and condition of wetland vegetation communities in the northern section of the Macquarie Marshes Nature Reserve (MMNR)**

- 7. The North Marsh supports the most extensive area of river red gum forest and woodlands in the Macquarie Marshes. Recent vegetation mapping in the northern section of the MMNR has shown the area of river red gum forest with wetland understorey has reduced in area by 22per cent i.e. of the 1860 ha mapped in 1991, 1486 ha remained in 2008. The area of river red gum woodland remained relatively stable over this time however the condition of this community has declined both in overstorey condition (tree health) and understorey composition (species richness and type).*
- 8. A 2008 survey of tree health and demographics in the Macquarie Marshes found that 73per cent of sites surveyed within the northern section of the MMNR were under extreme water stress and only 8per cent of sites were showing a demographic profile which indicated a "fair" regenerative potential - none were found to be "good". The composition of the understorey of river red gum woodland is now dominated by chenopod shrub species more indicative of dryland communities. In 1991 there were 4200 ha of river red gum woodland mapped. In 2008 this had increased slightly through recruitment*

*and all of this area had an understorey predominately comprised of chenopod shrubs. The chenopod shrubs have replaced the grass and forb species formerly described in 1981 as the understorey dominants in this community.*

*9. The death of more than 30per cent of river red gums in the woodlands of the North Marsh has been attributed to lack of flooding. River red gums in the Marshes need floods every 1-2 years. In 2004, trees that received a flood in 2000 but were not flooded in 2003 were under severe stress or dead. Since 2001, the Marshes have received less than 25per cent of their environmental water allocation which means less than 5000 ha of the Marshes has received a flood every 1-2 years. The mapped area of river red gum forest and woodland in the Marshes was 40,000 ha in 1991, a large proportion of this in the North Marsh. In 2008 it was likely that as much as 75per cent of these woodlands had not received adequate flooding for their survival and were in poor condition.*

*10. In the northern section of the MMNR there has been a 33per cent reduction in the area of waterbird habitat provided by semi permanent wetland vegetation that is common reed, cumbungi and water couch marsh. In 1991 a total of 3314 ha was mapped, in 2008 only 2228 ha remained and much of this was in poor condition. Individually, common reed has reduced in area by 4per cent, cumbungi by 75per cent (259 ha mapped in 1991, 58 ha in 2008) and water couch marsh by 87per cent (843 ha in 1991 to 113 ha in 2008). Declining condition of wetland vegetation is the most significant ecological issue for the northern section of the MMNR.*

#### ***Changes in ecological character of Wilgara wetland***

*11. The Draft Macquarie Marshes Adaptive Environmental Management Plan (AEMP) notes the following with regard to the Wilgara component of the Ramsar site (p 30):*

- vegetation mapping has shown little change in the spatial extent of the vegetation communities between 1991 and 2008, but the condition of some types has declined.*
- water couch marsh now has dryland chenopod shrubs occurring as a secondary species within the community.*
- surveys of tree health in the river red gum community of Wilgara showed a range from "fair" to "stressed" and all were considered "vulnerable" in terms of their regenerative potential. The very largest (and therefore probably the oldest) trees tended to be relatively healthy however some large trees and most of the younger ones showed signs of stress. The understorey at these sites included water couch and lignum, indicating that Wilgara has not progressed as far towards the dryland state seen in some other parts of the Marshes.*

#### ***Changes in colonial waterbird breeding***

*12. In the 15 year period between 1986 and 2001, colonially nesting species bred in 10 years at 14 sites throughout the Marshes. By 2008 several of the known breeding locations were considered in poor condition due to both lack of water and grazing pressure. There has been only one colonially nesting waterbird breeding event in the Macquarie Marshes since 2001.*

*13. Colonial nesting waterbirds have been recorded breeding in five locations in the northern section of the MMNR. In 2000, in which the last large flood and breeding event occurred, three locations were used. The two locations not used were Hunt's Woodland, a river red gum bird breeding site that has not been used since 1993 and Loudon's Lagoon, a common reed and marsh club-rush site that has not been used since 1998. The vegetation in Hunt's woodland is stressed and approximately 30per cent of trees are dead and the vegetation in Loudon's Lagoon is considered in poor condition*

*probably due to lack of water, a reedbed fire and the impact of high densities of pigs, goats and kangaroos.*

*14. A small egret colony nested successfully in river red gum forest on Bora Channel in 2008.*

## Appendix B

[Water recovery and 'over recovery' in the Macquarie Valley](#) Slattery & Johnson August 2021.