

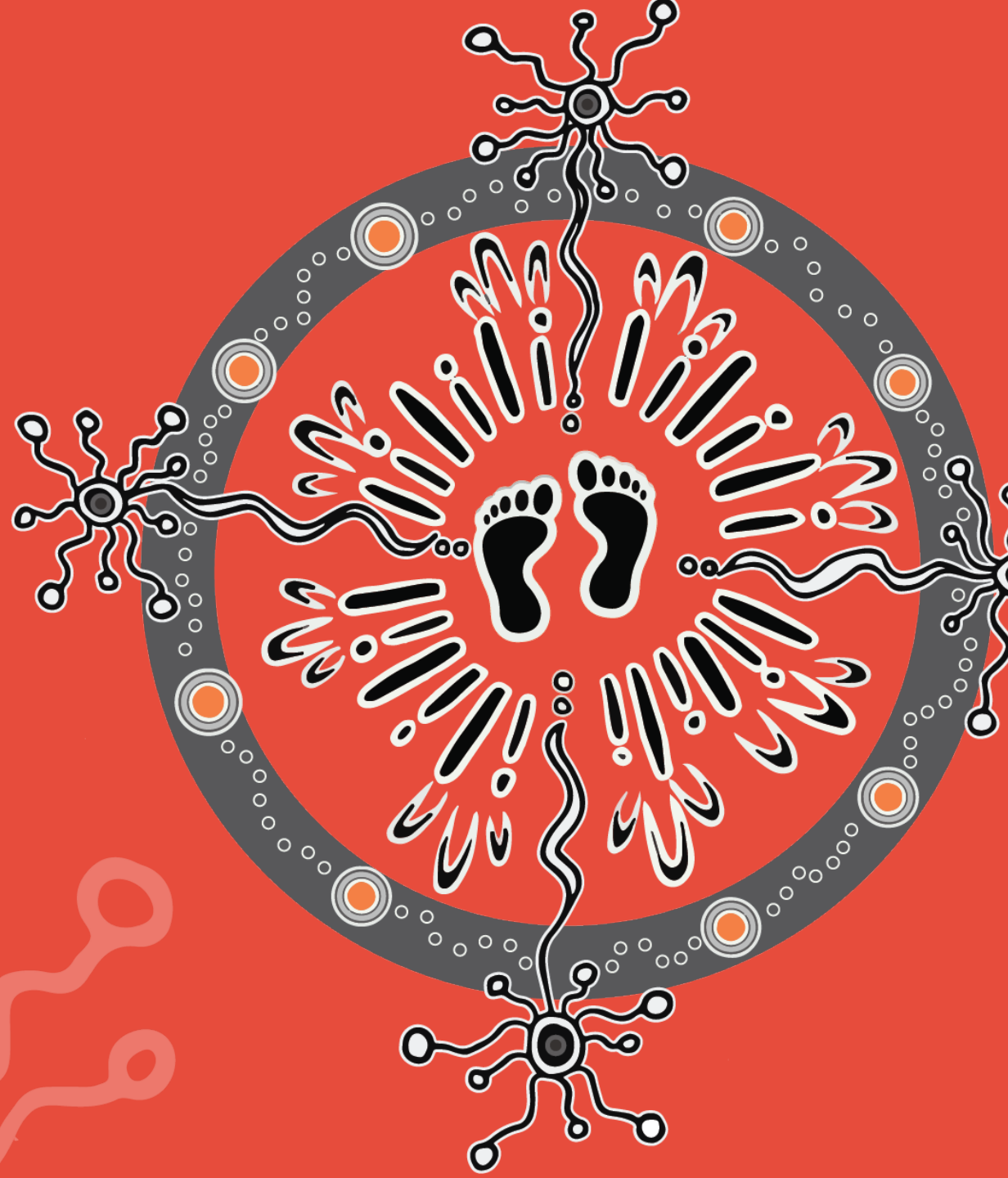
Department of Planning and Environment

Floodplain harvesting in the Namoi Valley

December 2022



Acknowledgement of Country



Overview of Proceedings

1. Context setting
 - NSW Government priority
 - Namoi timeframes and influencing factors
2. Namoi - technical assessments
 - Model build
 - Model scenarios
 - Cumulative downstream outcomes
 - Predicted environmental benefits
3. Namoi - proposed water sharing rules for floodplain harvesting licences
 - How to make a submission

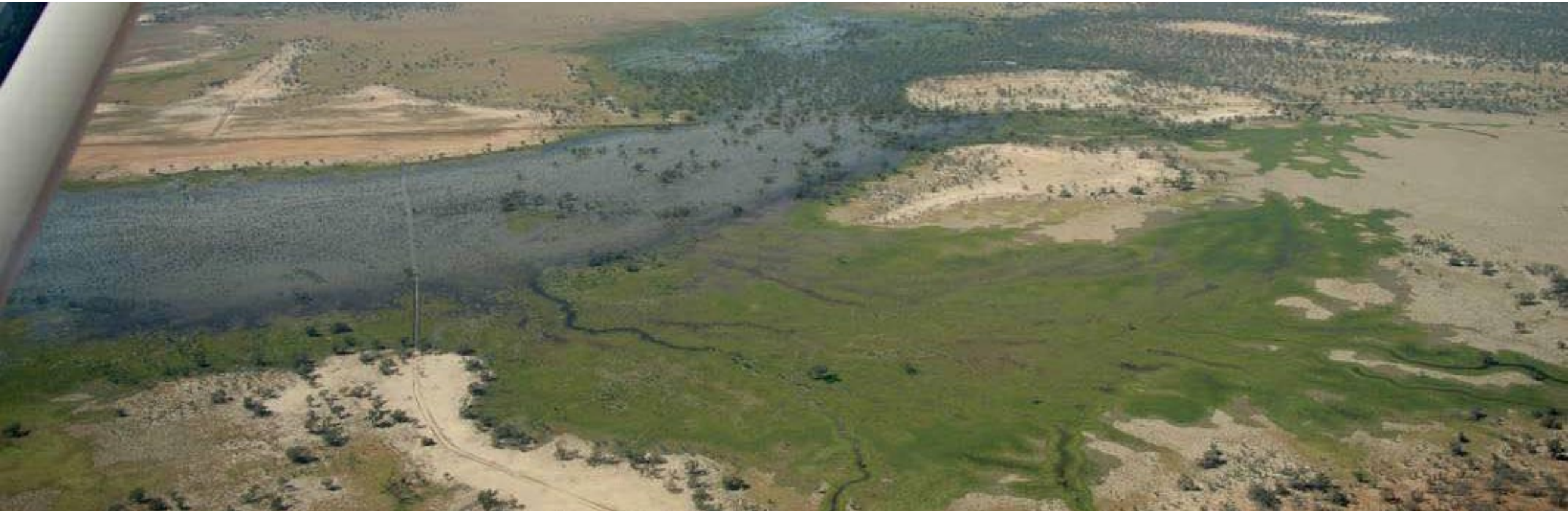
Introduction of Presenters

Facilitator

- **Steve Rossiter**, ATX Consulting

Presenters

- **Mitchell Isaacs**, Chief Knowledge Officer
- **Dan Connor**, Director Floodplain Management
- **Michael Sugiyanto**, Lead Modeller
- **Allan Raine**, Director Water Planning Implementation



Context setting – what are we doing and why are we doing it now?

Mitchell Isaacs, Chief Knowledge Officer

NSW Government priority



LEGISLATIVE COUNCIL

SELECT COMMITTEE ON FLOODPLAIN HARVESTING

- Healthy rivers *and* healthy farms – not one or the other
- Doing nothing is not an option
- Reform will improve
 - environmental protections
 - environmental and downstream outcomes
 - security and certainty for businesses and communities.

This reform is too important to delay



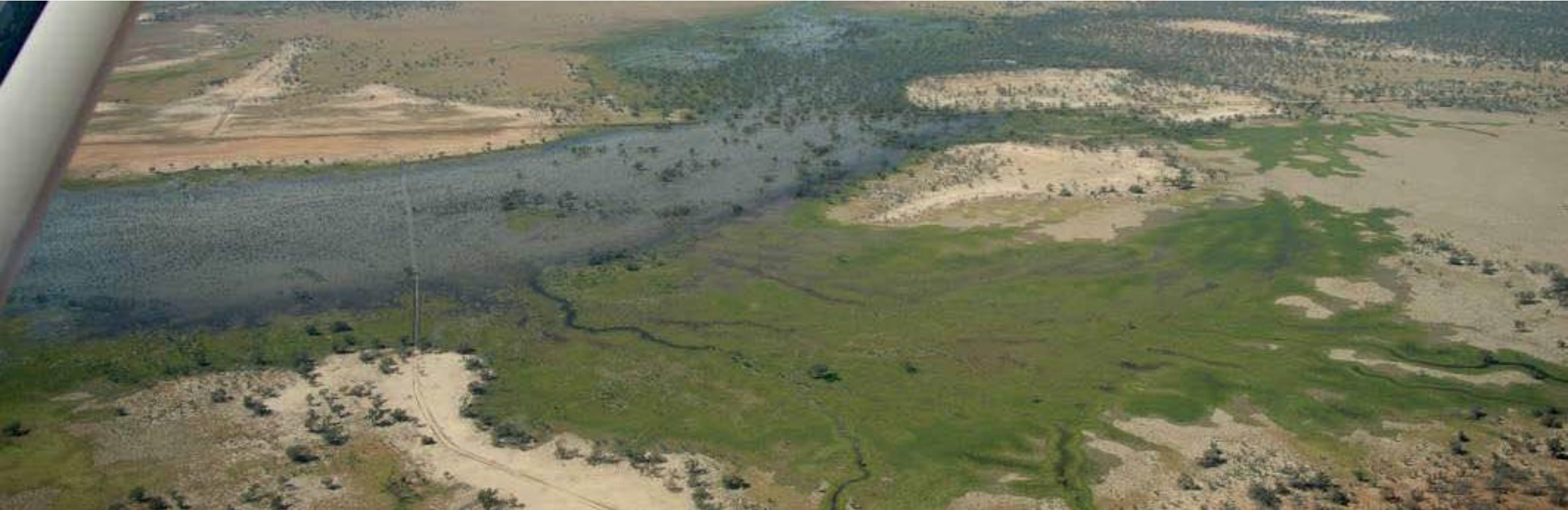
Namoi timelines and influencing factors

Note: WSP submission period intentionally overlaps peer review

	December	January	February	March	April	May	June
WSP public exhibition period – FPH rules	■	■					
Model peer review - FPH	■	■	■				
Draft FPH entitlements – submission period			■	■			
Consultation report published				■	■	■	■
WSP/WRP amendments - FPH				■	■	■	■
Entitlement determination - FPH					■	■	■

Note, framework commencement date depends on:

- public submissions
- peer review outcomes
- draft entitlement submission outcomes
- concurrence to amend the WSP



Floodplain harvesting in the Northern Basin

Dan Connor, Director Floodplain Management

Floodplain harvesting reform - outcomes for NSW

Implementation of the policy will ➔

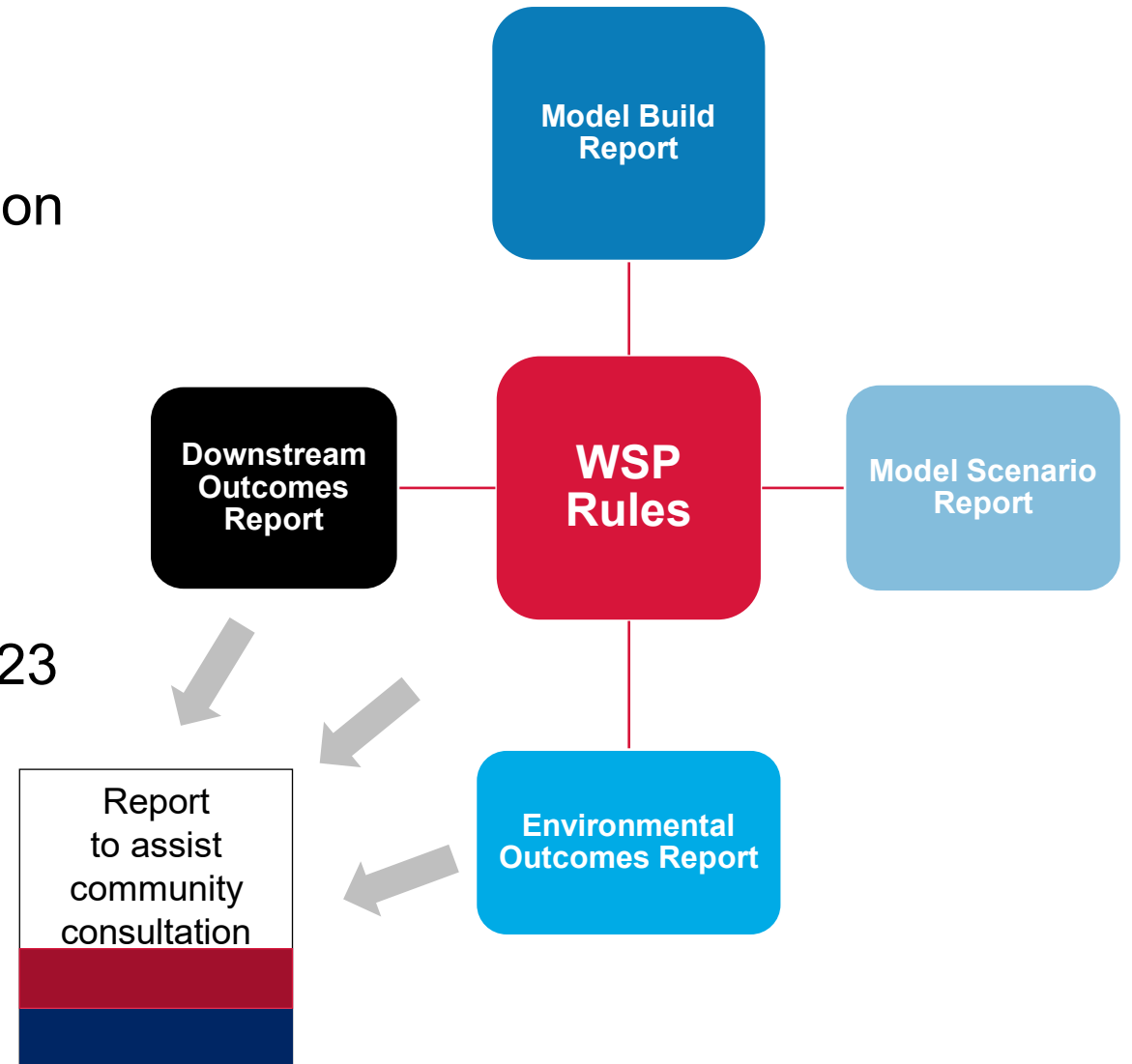


Current status – Northern Basin

Valley	WSP Consultation	Work Approvals	Licences	WSP Rules
Border Rivers	✓	✓	✓	✓
Gwydir	✓	✓	✓	✓
Macquarie	✓	✓	Q1-Q2 2023	✓
Barwon-Darling	✓	Q1 2022	Q1-Q2 2023	Q1-Q2 2023
Namoi	Q4 2022	Q1-Q2 2023	Q1-Q2 2023	Q1-Q2 2023

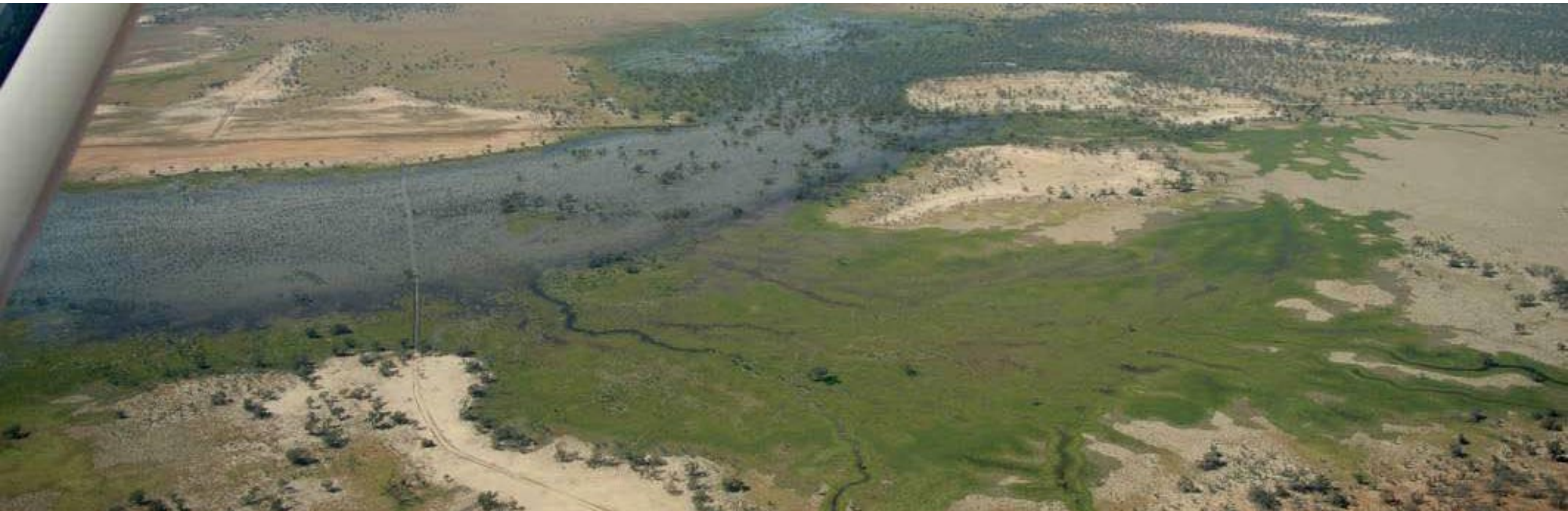
Current stage- WSP Consultation - Namoi

- Development of proposed rules
- Report to assist brings it all together
- WSP rules come into effect thru conditions on licences and approvals
- Webinar, 6 December
- Public meeting in Wee Waa, 13 December
- Submissions close - 29 January 2023
- What we heard report - February/March 2023



Questions and answers

Steve Rossiter



Floodplain harvesting – Namoi model

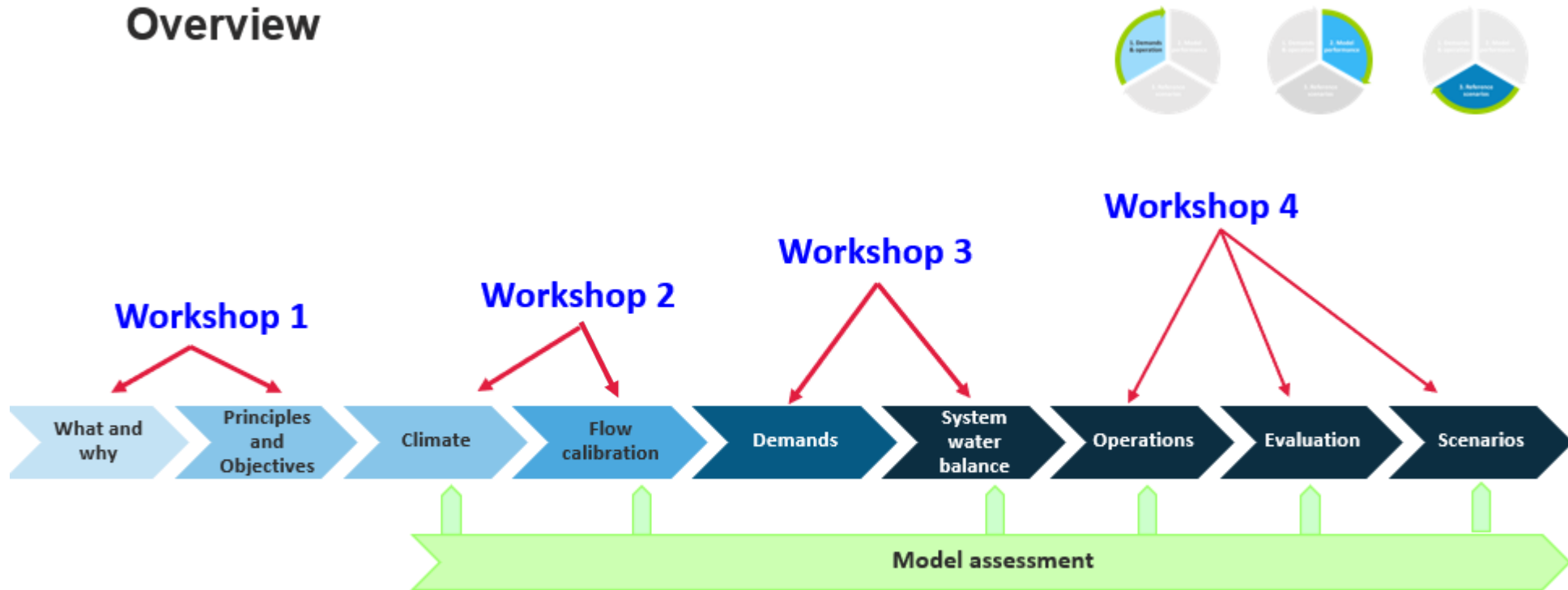
Michael Sugiyanto, Lead Modeller

Using models to determine licences

- Models used to inform water management, policy and planning
- Emerged modelling responsibility to determine floodplain harvesting entitlements
- Pre-existing models fit for *prior* purposes:
 - Policy, planning, diversion compliance
- BUT has critical limitations for estimating floodplain harvesting
- Upgraded modelling includes unprecedented additional detail
 - New data (e.g. individual farm visit)
 - Additional capability (floodplain harvesting)
 - NHMP Commitment → IQQM to eWater Source

Model implementation process

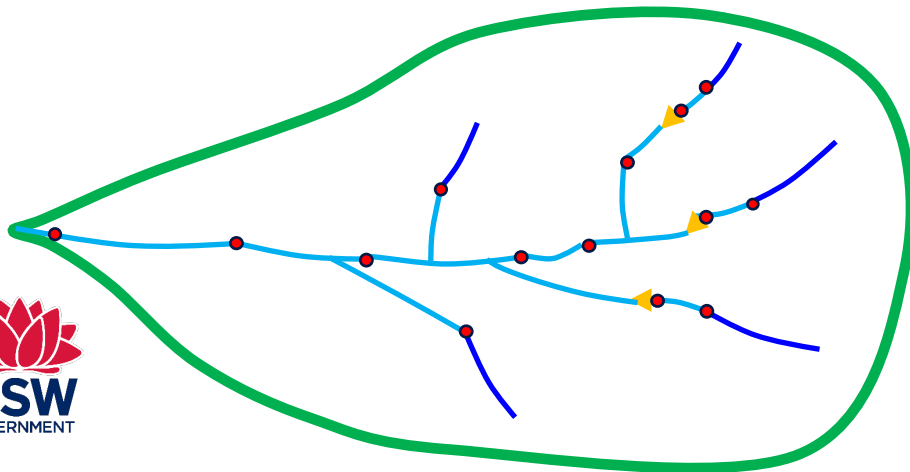
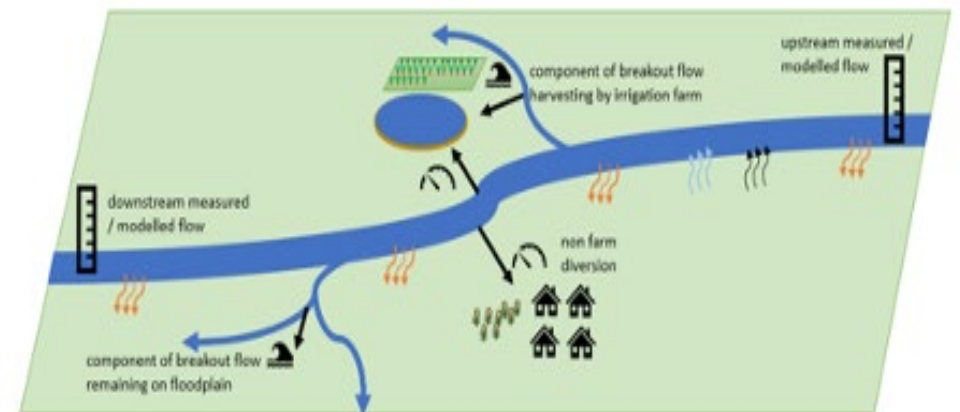
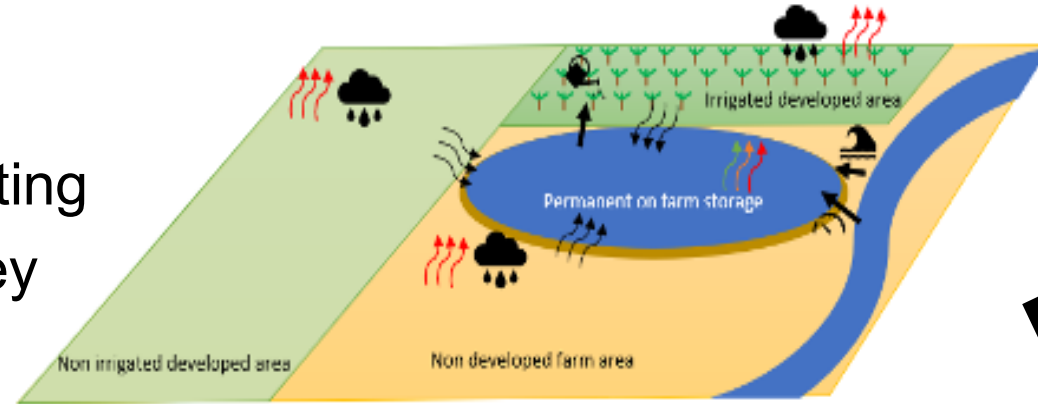
Overview



Building the model of the Namoi

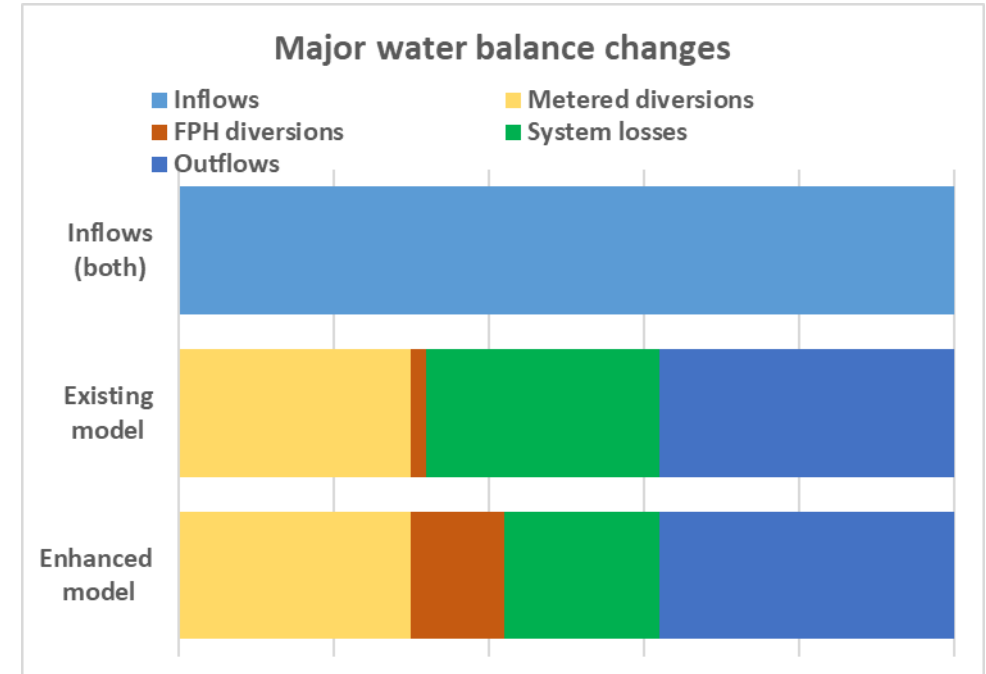
Technical report

- How modelling of floodplain harvesting was undertaken for the Namoi Valley
- Independent review
- *Building the Namoi Valley river system model report* – available online



Water balance outcomes at valley scale

- Inflows don't change
- Metered diversions don't change
- Flow remaining in rivers does not change
- Previous high system 'losses' repartitioned:
 - Lower losses
 - Floodplain harvesting
- Return flows not modelled



Fully simulated performance

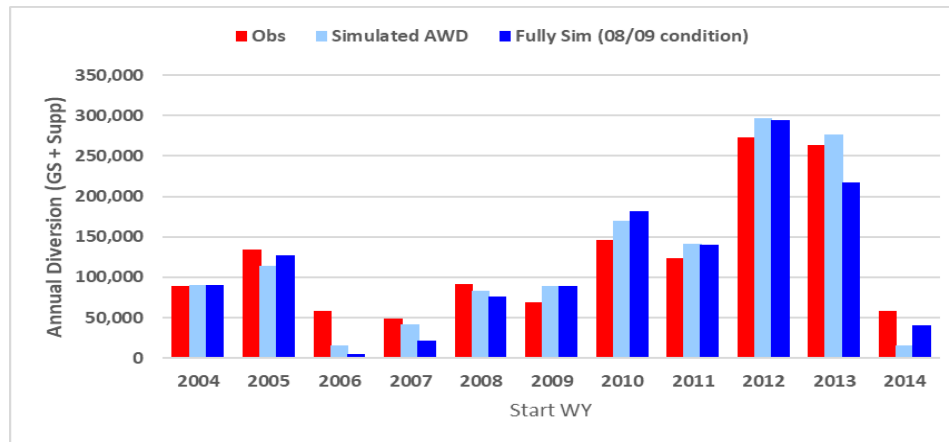
- All components simulated

Run description	Forcing		
	Area	AWD	Keepit inflow
AWD			

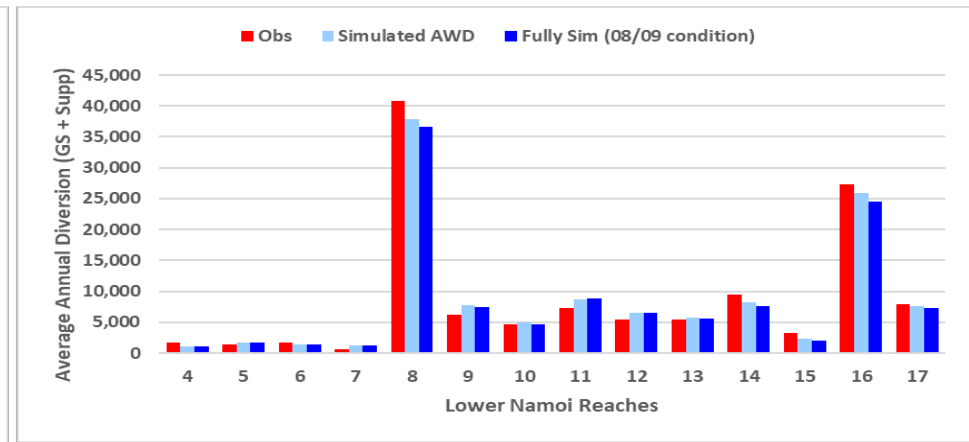
- Shows progressive degradation as more things are simulated
- Reproduces average behaviour rather than unique decisions

Run	GS	SA	GS + SA
Irrigation demand	-4%	-6%	-4%
Area Risk	-2%	9%	-1%
Simulated AWD	1%	-9%	-2%
Full simulating	-4%	-9%	-5%

Temporal Performance

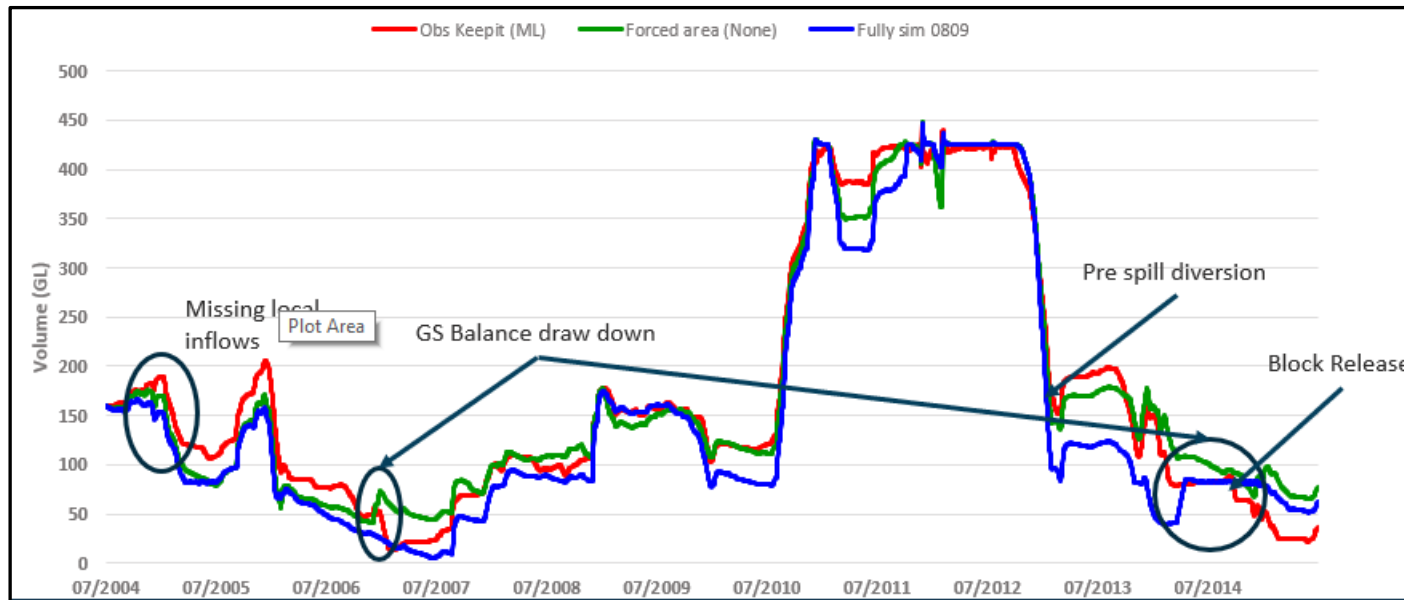


Spatial Performance

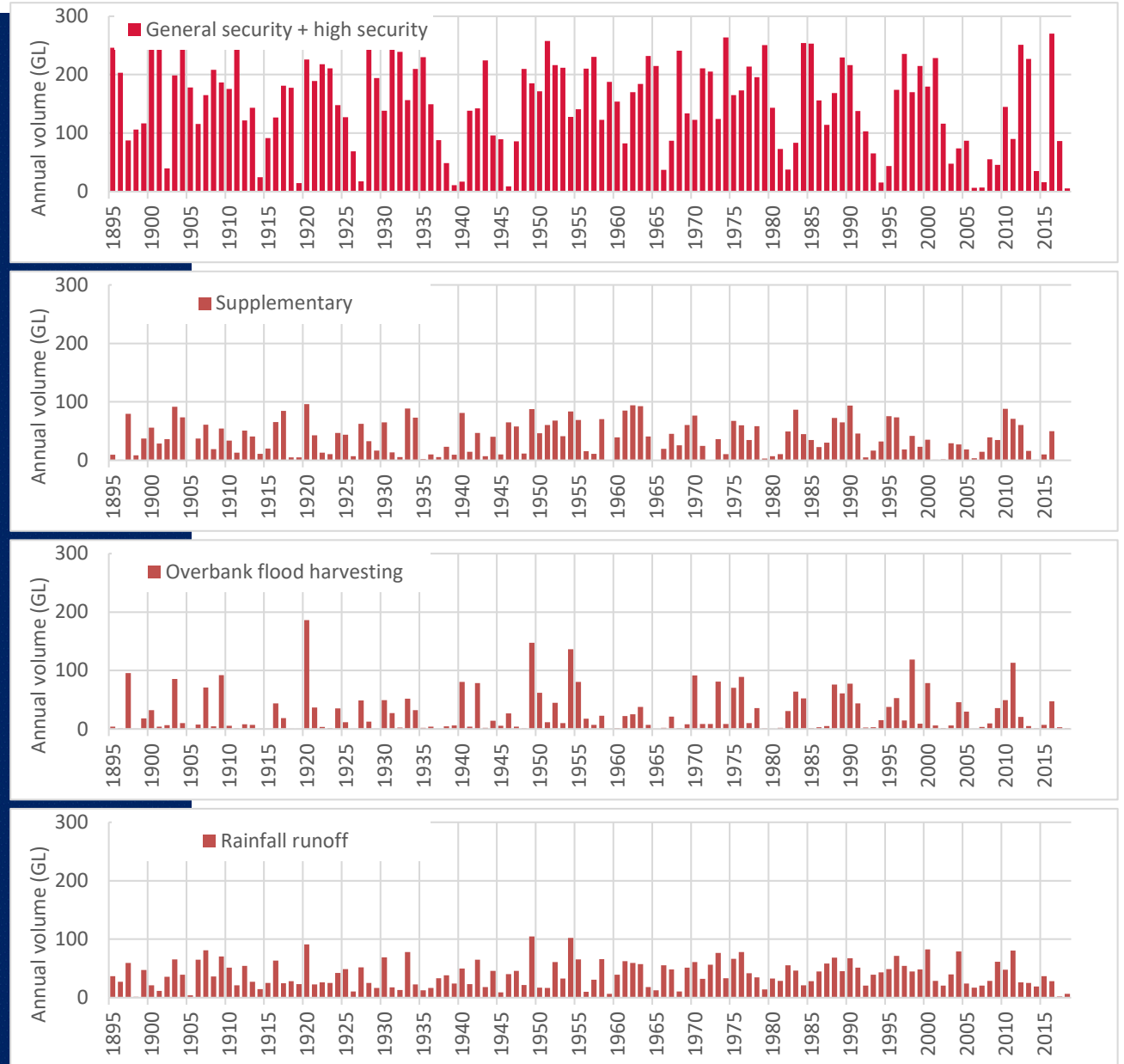


Model performance

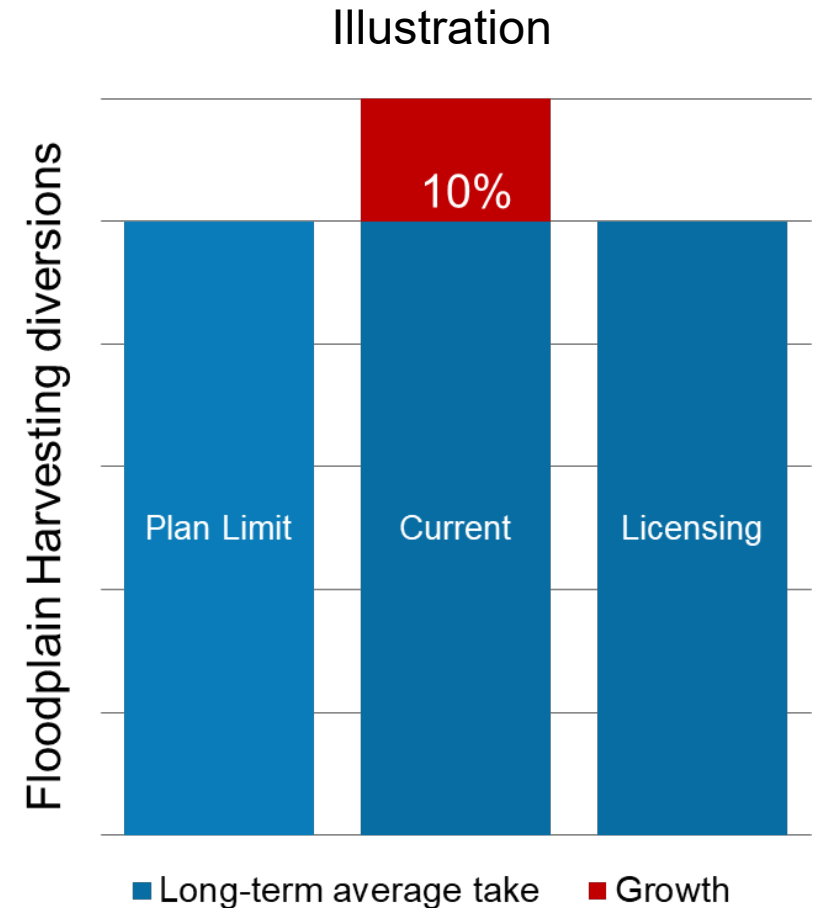
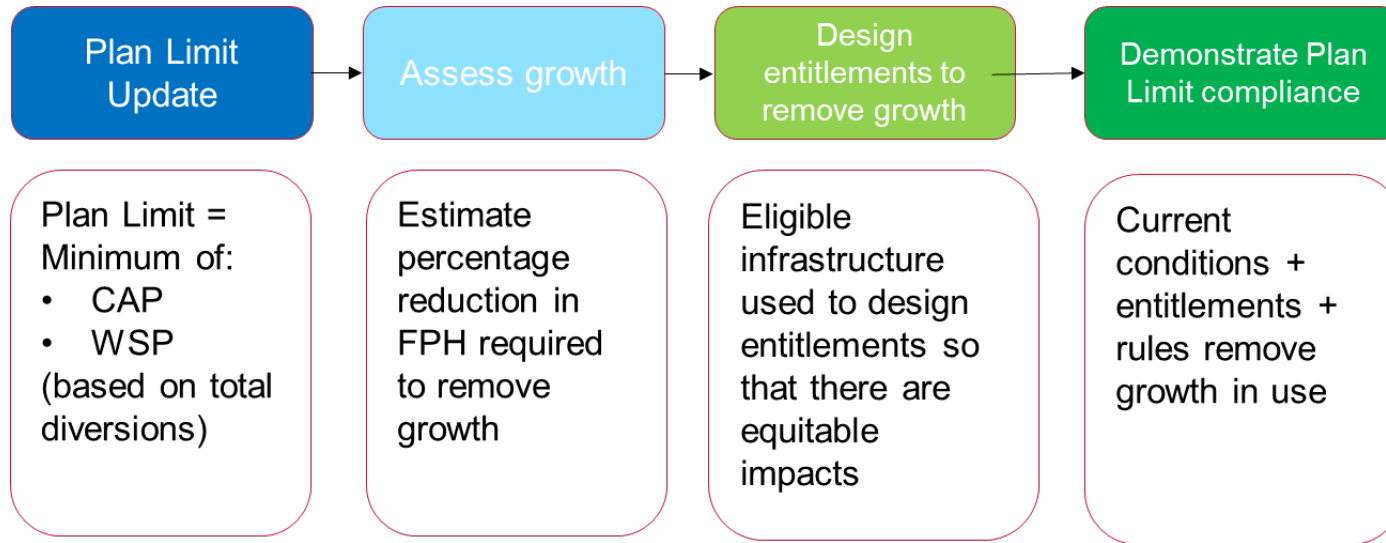
- **Keepit storage volume**
 - Biggest degradation when simulating crop area (average risk function)
 - 2011/12 event came around Nov/Dec – model is configured with planting decision around mid October



Namoi water balance



Scenarios and their usage to determine entitlements



Model Scenario – Namoi

Technical report

- Model run of the Namoi used to determine entitlements
- *Floodplain Harvesting Entitlements for Namoi Regulated River System Model Scenario Report* – available online

Dates of development	<i>Developed area (ha)</i>	<i>Permanent on-farm storage capacity (ML)</i>
1993/1994	68,170	139,580
1999/2000	69,480	173,180
2008/2009	93,450	208,820
Current	97,260	218,240

43% increase in developed area since 1993/94

57% increase in permanent storage since 1993/94



Model Scenario – Namoi

Diversion category	<i>Plan Limit Scenario (GL/yr)</i>	<i>Current Conditions Scenario (GL/yr)</i>
General and High Security	144.6	144.8
Supplementary Access	34.4	42.1
Floodplain harvesting (A + B)	46.5	51.3
(A) Overbank flow harvesting	25.2	30.6
(B) Non-exempt rainfall runoff harvesting	21.3	20.7
(C) Exempt rainfall runoff harvesting	16.2	21.0
TOTAL (less exempt rainfall)	225.6	238.3
TOTAL	241.7	259.3

5.6% growth above the legal limit

10% growth in floodplain harvesting (addressed via licensing)

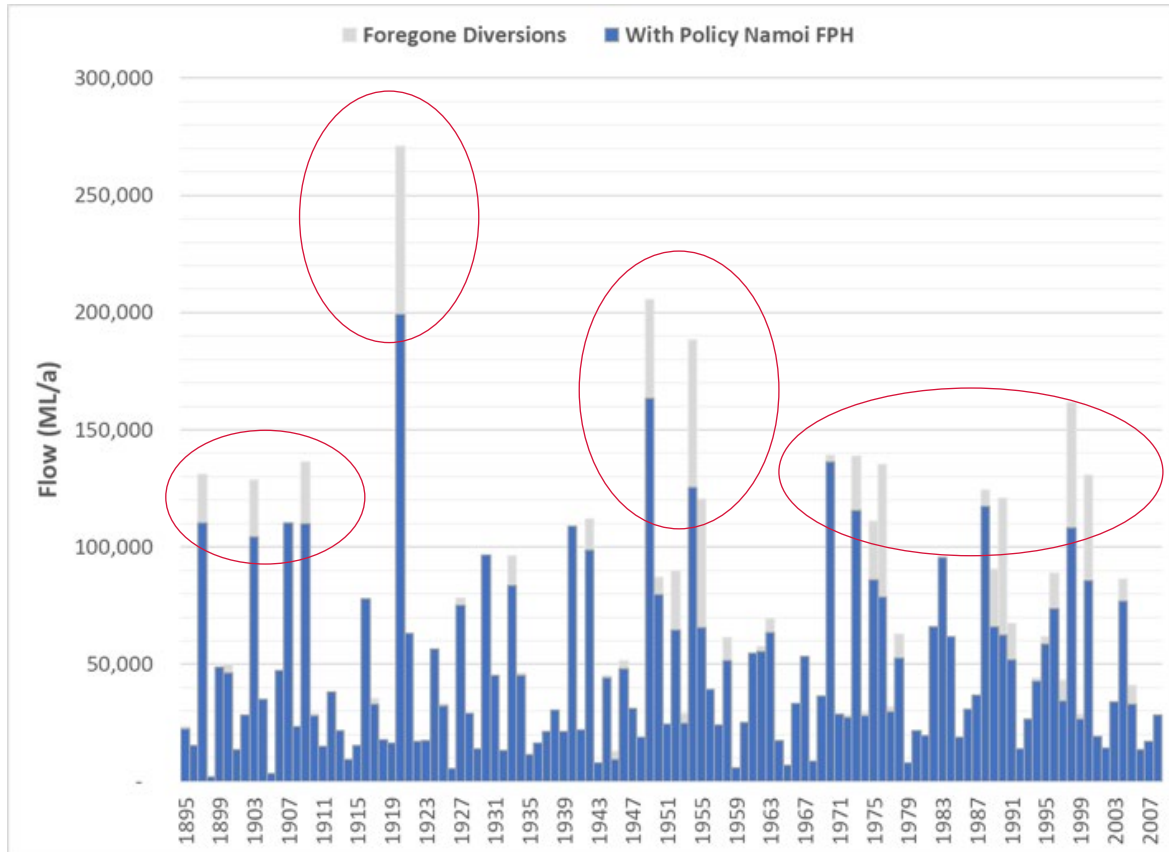
22% growth in Supplementary Access (addressed via AWD process)

Result = 13 GL/yr returned to floodplains, rivers & creeks



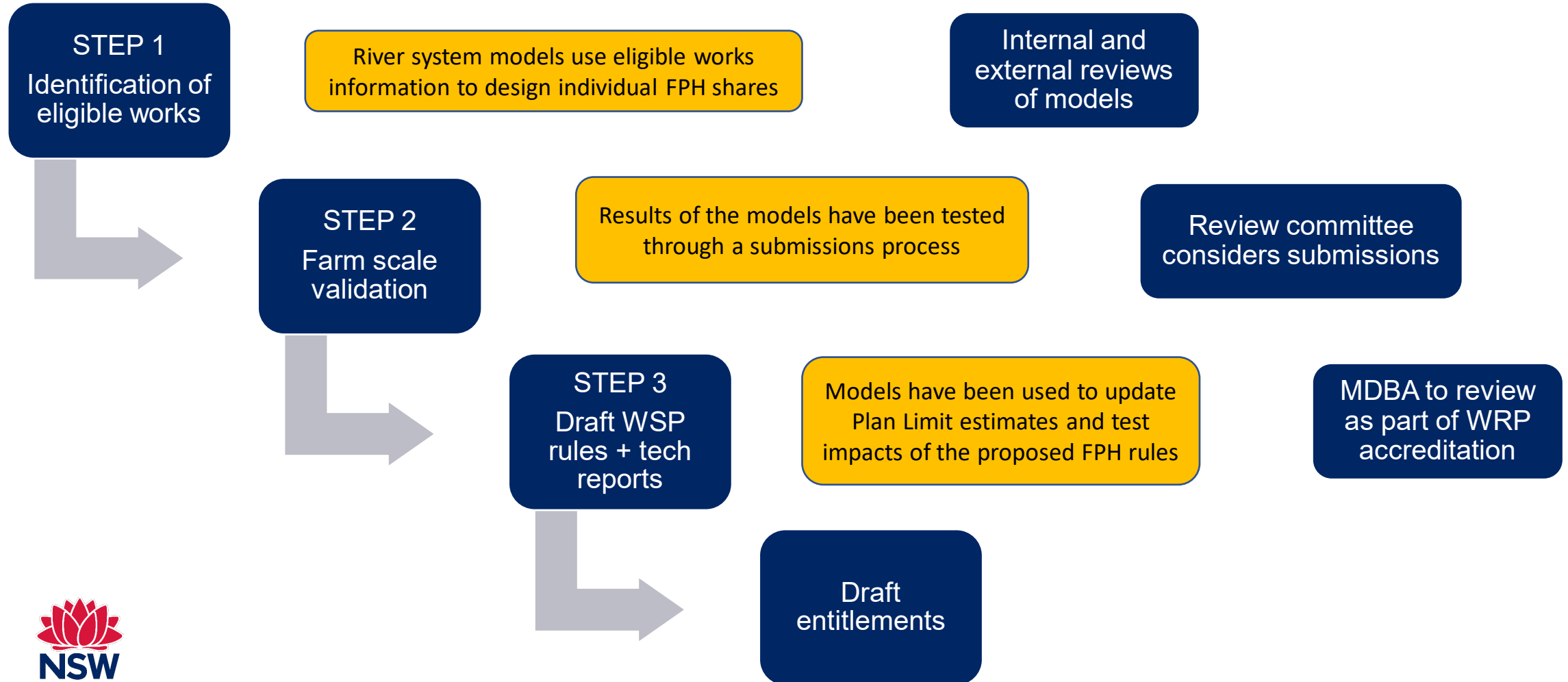
NSW
GOVERNMENT

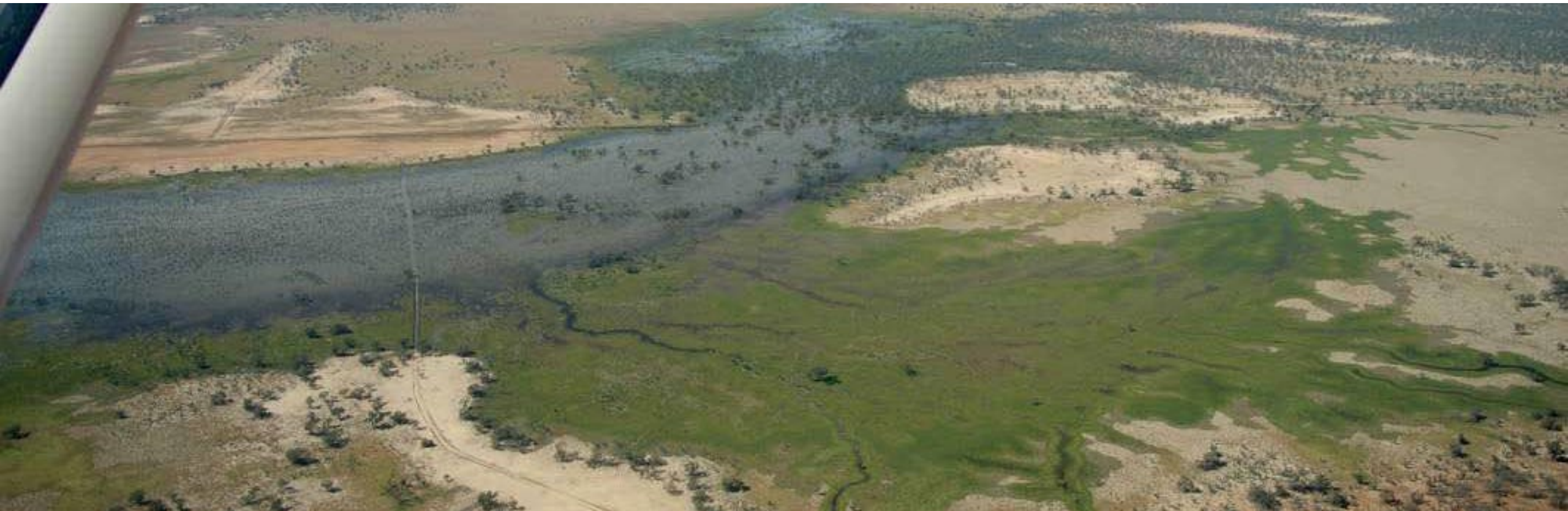
Annual changes to floodplain diversions



- Long-term averages can 'mask' the annual changes
- Biggest impacts are in the wet years
- All valleys included in the cumulative downstream outcome report

Modelling review and governance processes





Floodplain harvesting – downstream assessments

Michael Sugiyanto, Lead Modeller

Modelled downstream effects – Northern Basin

All valleys licensed

100% return flows = maximum possible flow increase

Location	Annual mean flow (GL)	Annual mean flow change (GL)	Annual mean flow change (%)	Annual max flow change (GL)	Change in max year (%)
Walgett (422001)	1,306.9	+37.5	+2.9	+328.0	+8.2%
Bourke (425003)	1,837.7	+31.1	+1.7	+289.9	+4.0%
Wilcannia (425008)	1,376.8	+22.0	+1.6	+166.8	+14.1%

Annual flow increases

Walgett: 0 - 328GL/yr

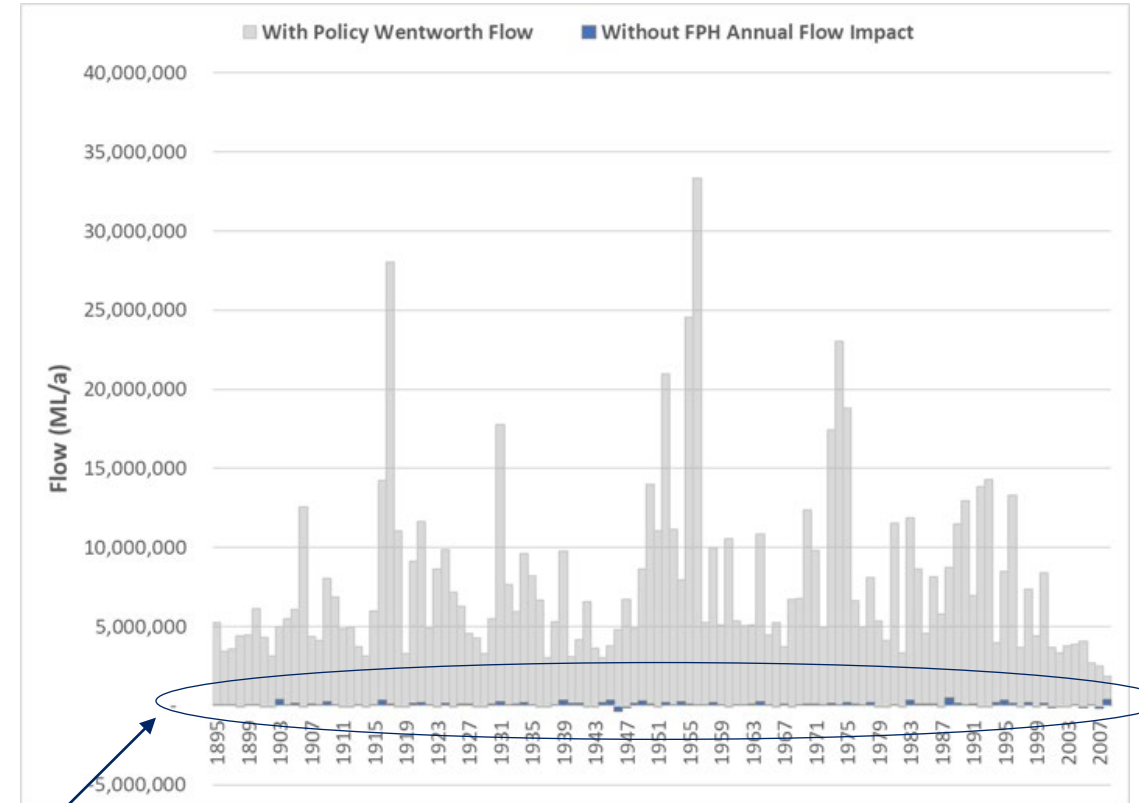
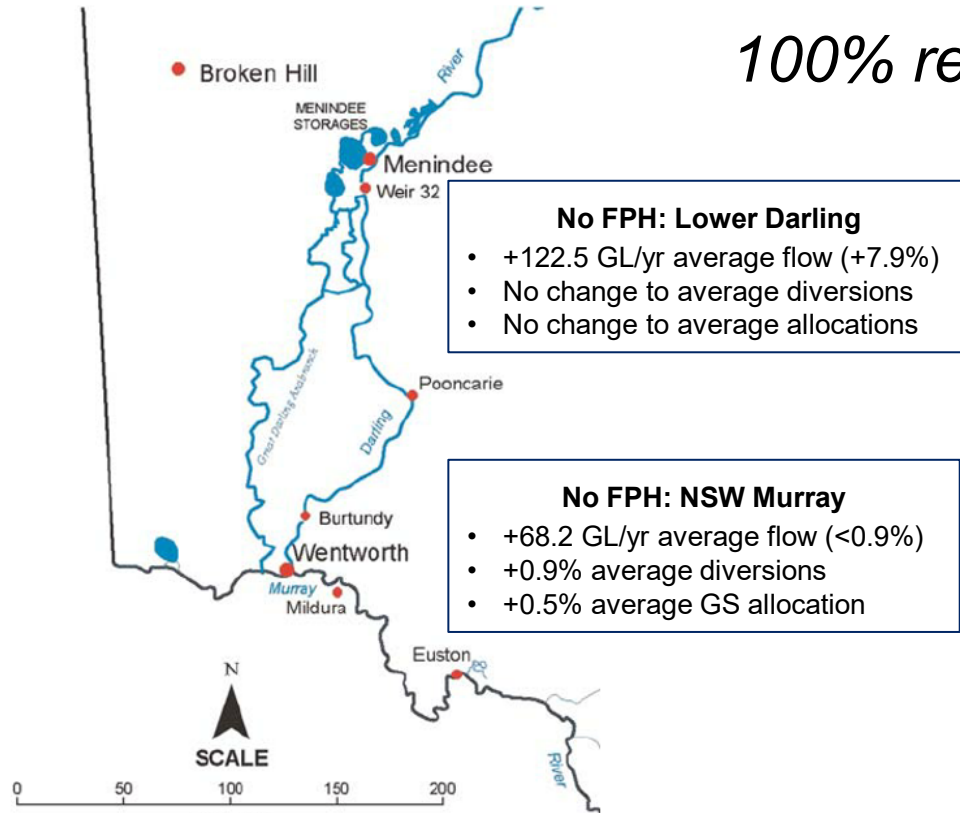
Bourke: 0 - 290GL/yr

Wilcannia: 0 - 167GL/yr

Modelled downstream effects – Southern Basin

All valleys licensed

100% return flows = maximum possible flow increase



Difference with **no** Floodplain harvesting at all

Benefits snapshot

Impacts and benefits are correlated

- Within individual floodplains (valleys) – **significant benefits** to many interests
Valley-based analyses at:
<https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/water-sharing-plan-rules>
- Within northern Basin – **modest benefits to many interests** during wet and very wet periods
- Within southern Basin – **no disbenefits to water allocations or flows** from floodplain harvesting in the northern Basin



Questions and Answers

Steve Rossiter



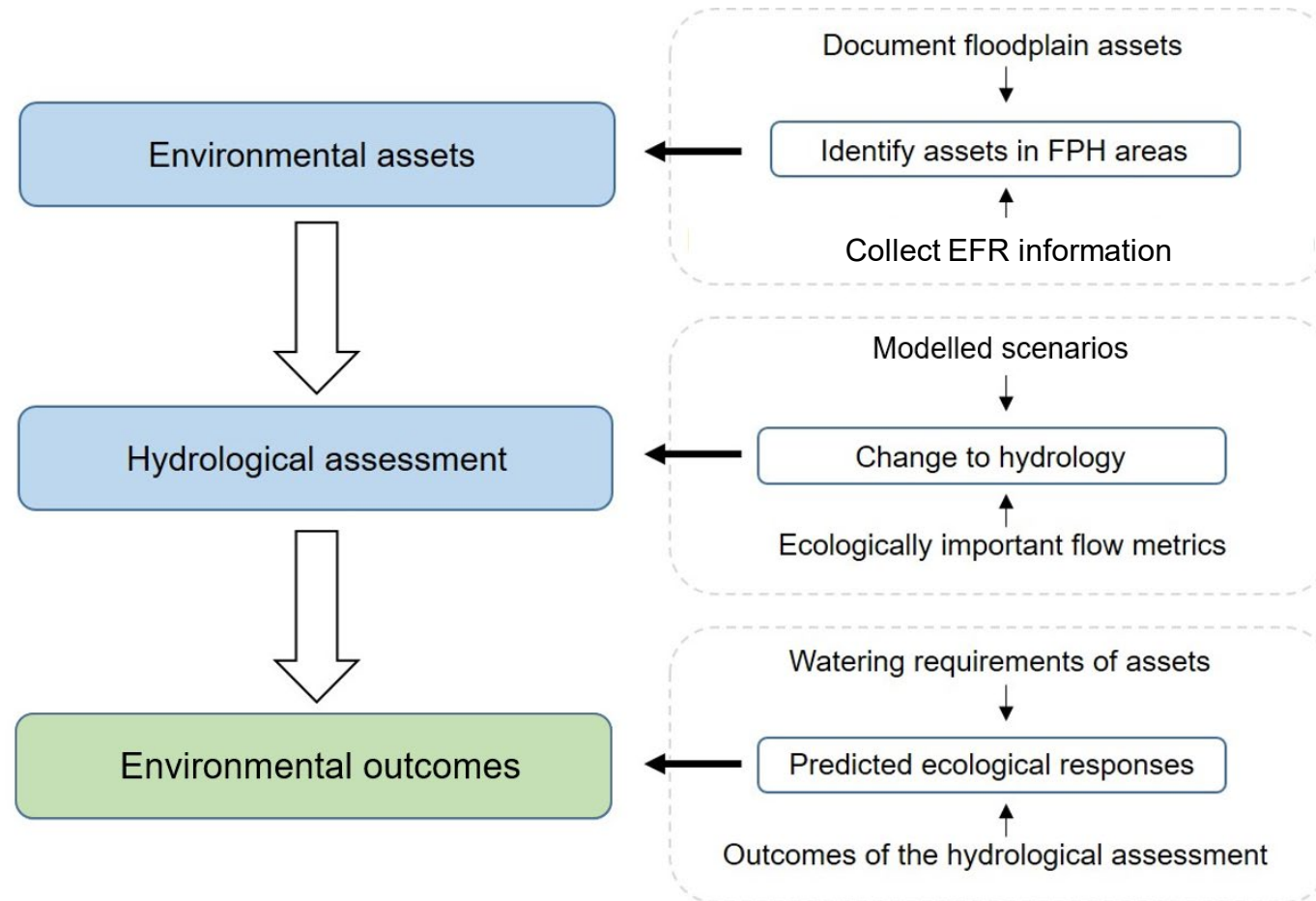
Predicted environmental outcomes

Dan Connor, Director Floodplain Management

How did we identify the environmental outcomes?

Assessment is driven by data availability

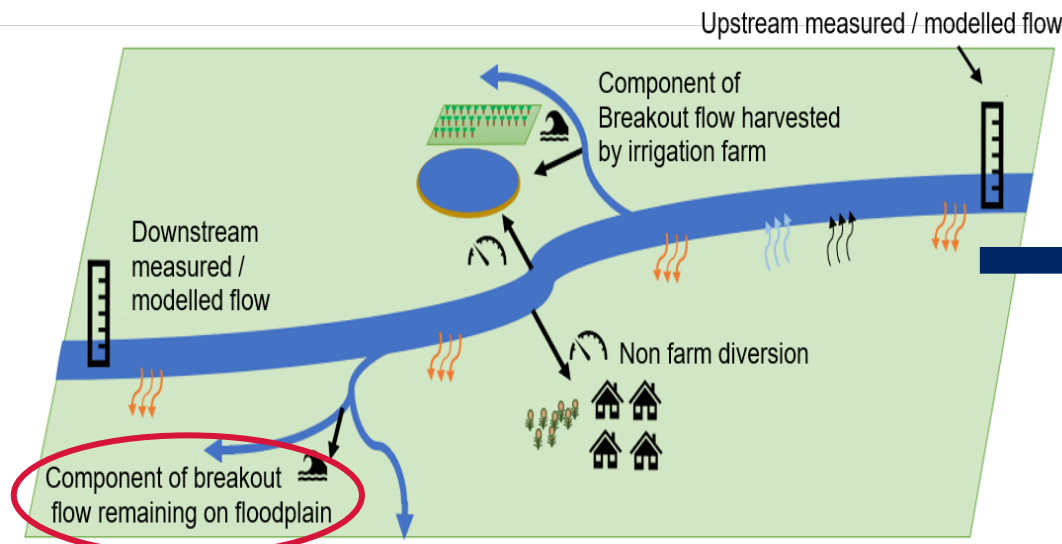
1. Floodplain environmental assets (locations) and values (species or functions)
2. Hydrological models: with and without the policy
3. Environmental flow requirements for these assets and values



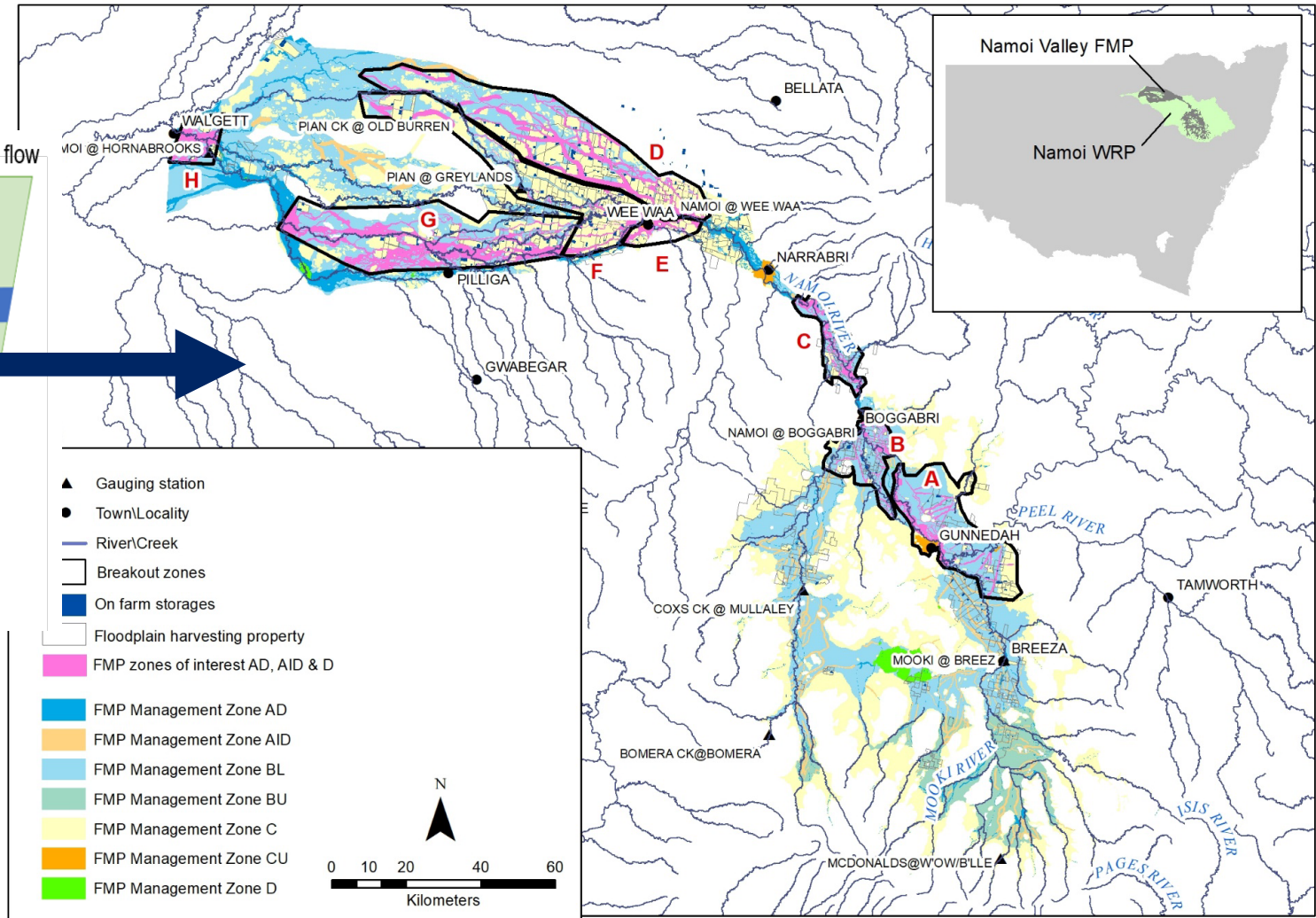
Selecting locations for the assessment

Breakout zones are where hydrologic information is available

Modelled floodplain flows

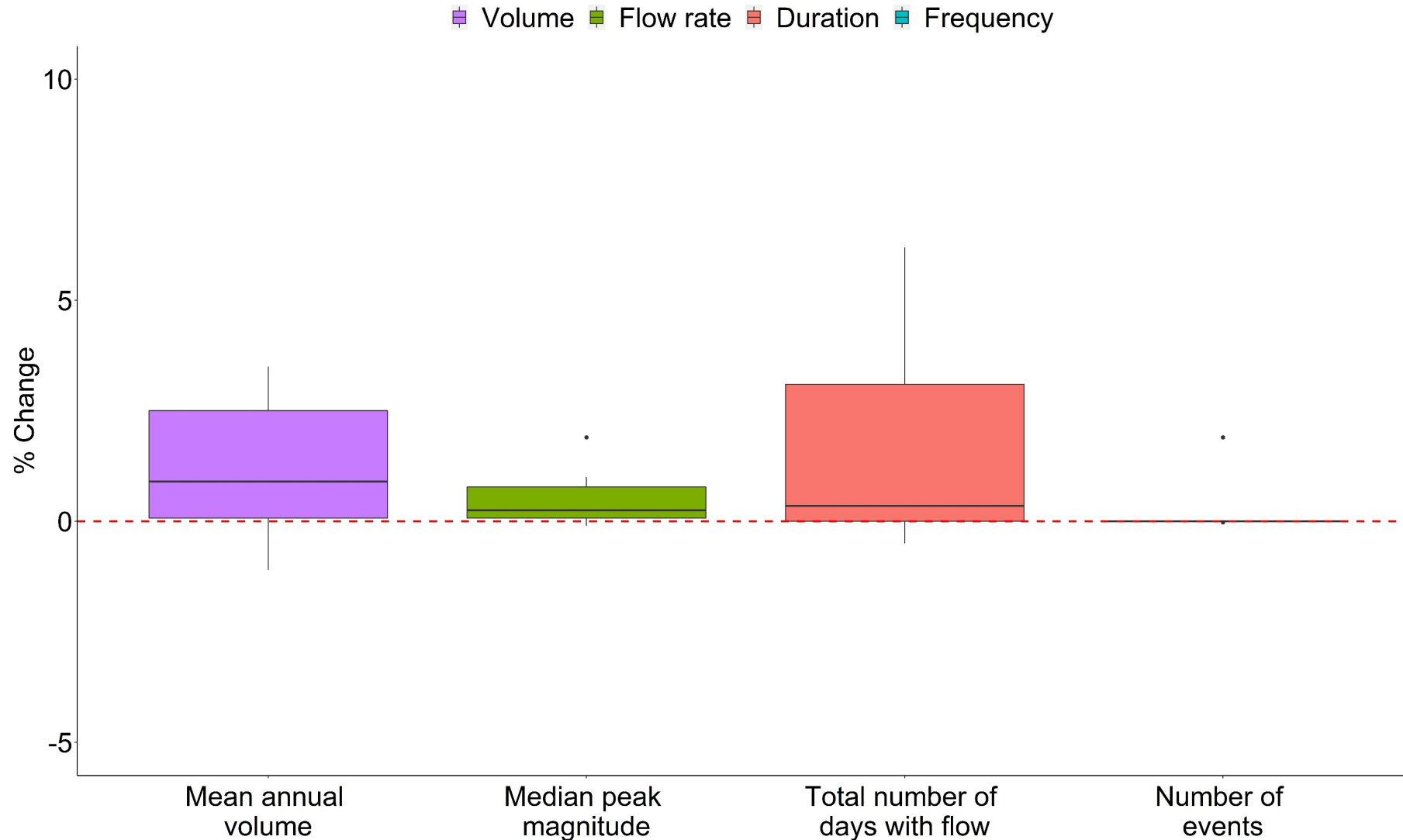


Model node which represents flow remaining on the floodplain at each breakout
(End of system breakout)



What are the predicted outcomes for the Namoi?

Changes to floodplain hydrology



Changes to floodplain hydrology cont.

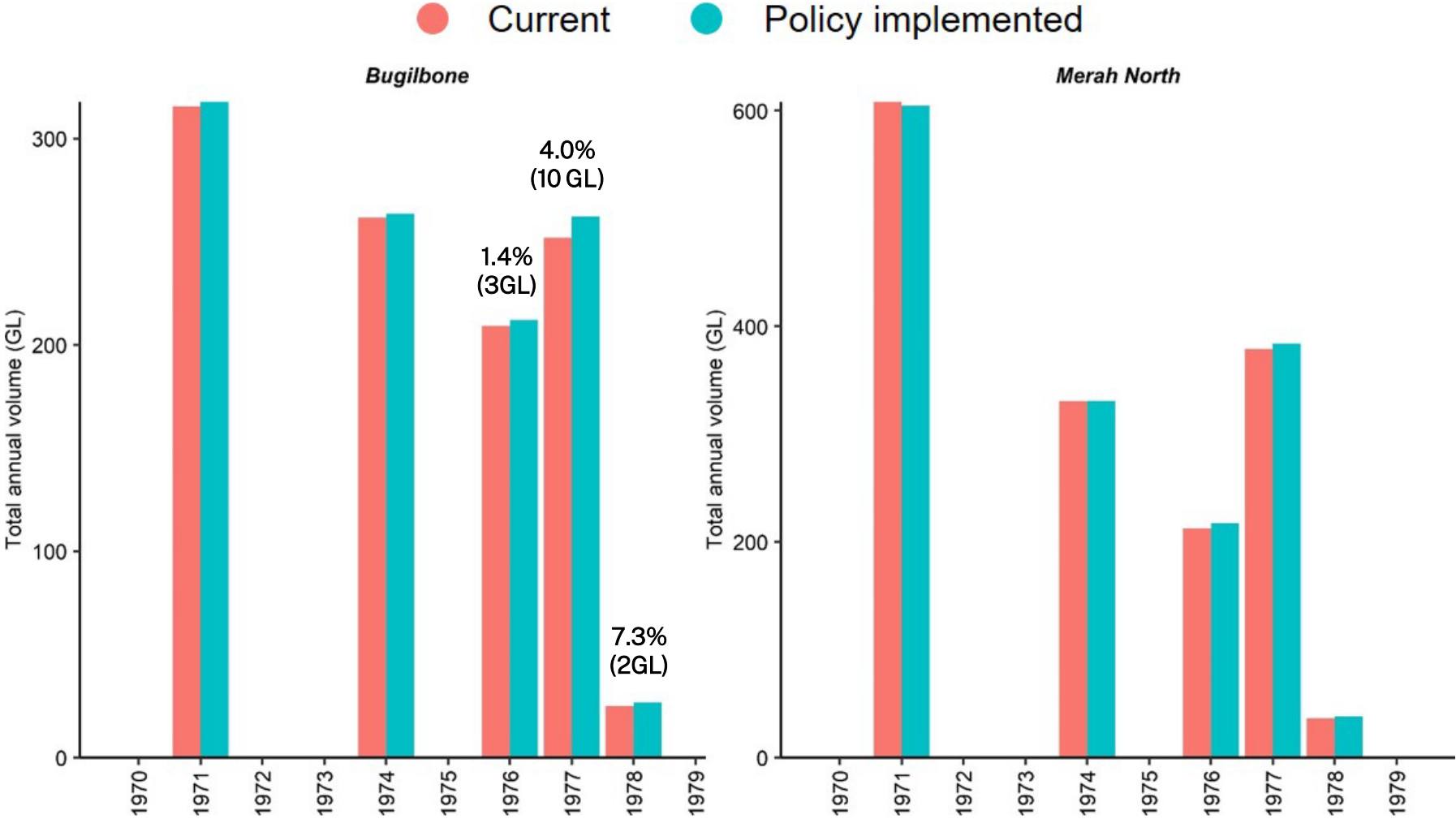
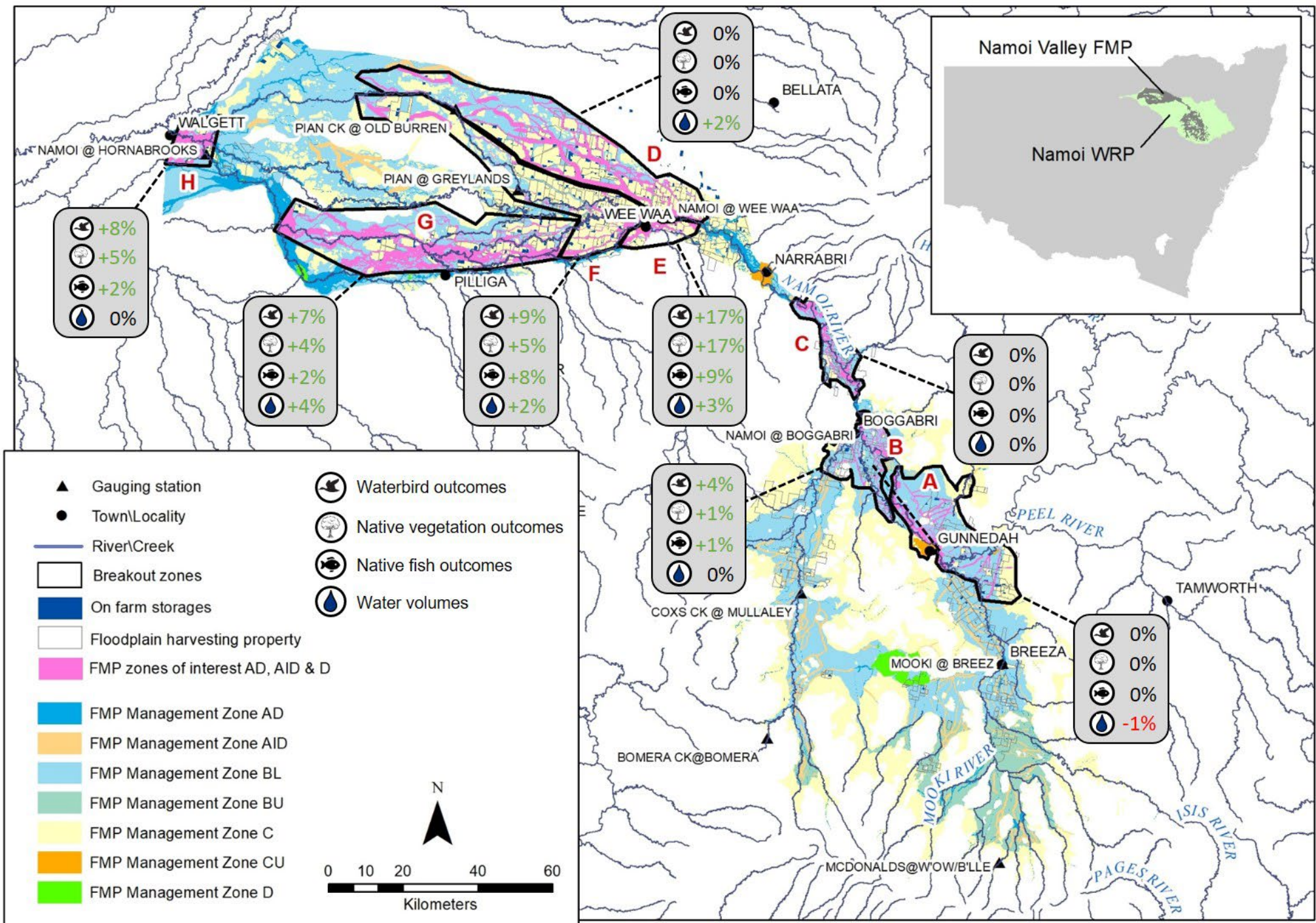
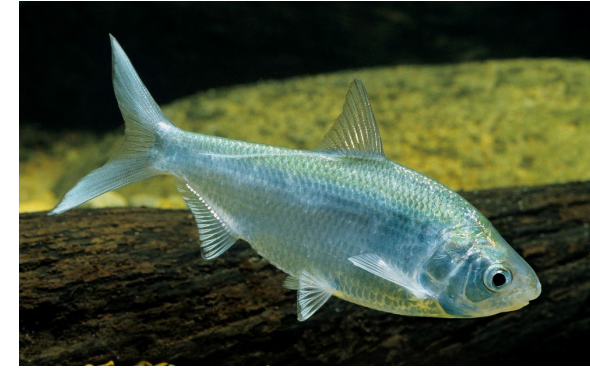


Figure 16. Modelled total annual volumes (GL/year) 1970-1979 and floodplain breakout volume (GL/d) for two the breakout zones with most predicted change to hydrology (Bugilbone (G) and Merah North (F)). Data represents the volumes remaining after FPH diversions have been applied.



Predicted ecological outcomes: Native fish



- Representatives of three fish guilds: flow pulse, floodplain specialists, and generalists
- In total, 10 EFR metrics and 23 tests were undertaken
- 10 are predicted to improve by 5-10%
- Another 10 are not predicted to change by more than 1%



Outcomes varied considerably by location, with only 3 from 8 zones improving by more than 2% (7-9% increase averaged across native fish)

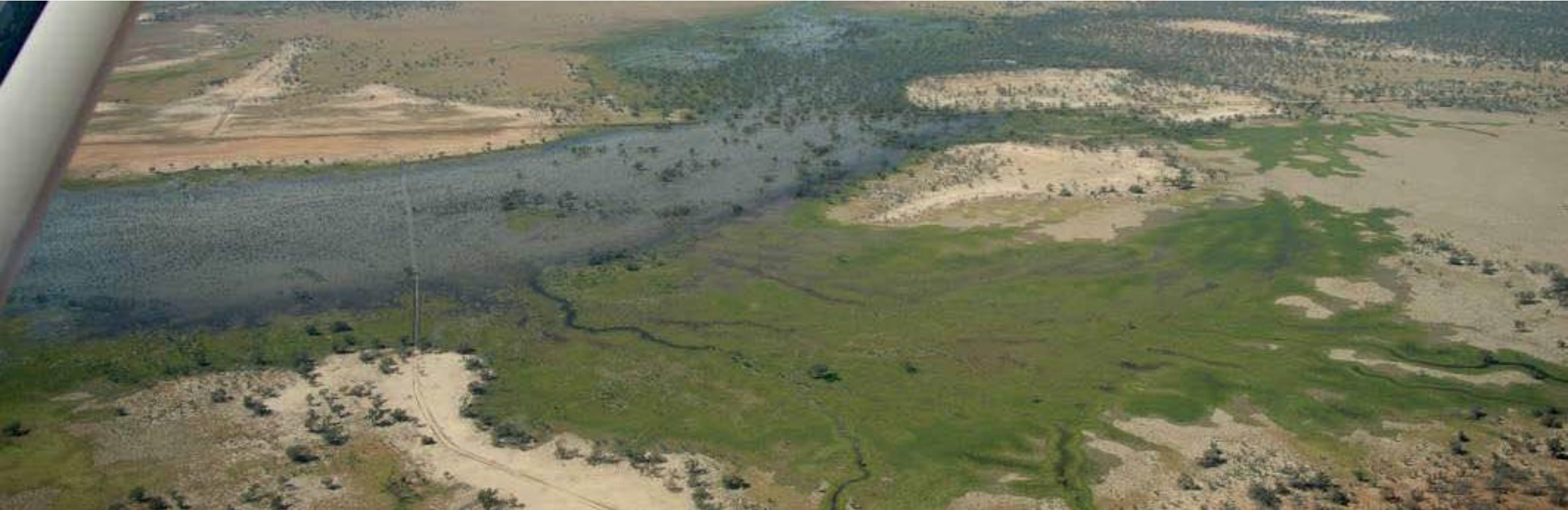
Predicted ecological outcomes: Native vegetation

- Key species assessed:
 - Lignum, blackbox, coolabah, river cooba, river red gum and water couch
- Small increase in the achievement of most the native vegetation EFRs tested
- Predicted changes varied greatly across the floodplain:
 - 3 zones expected to receive improvements of more than 5% with little change to others



Questions and Answers

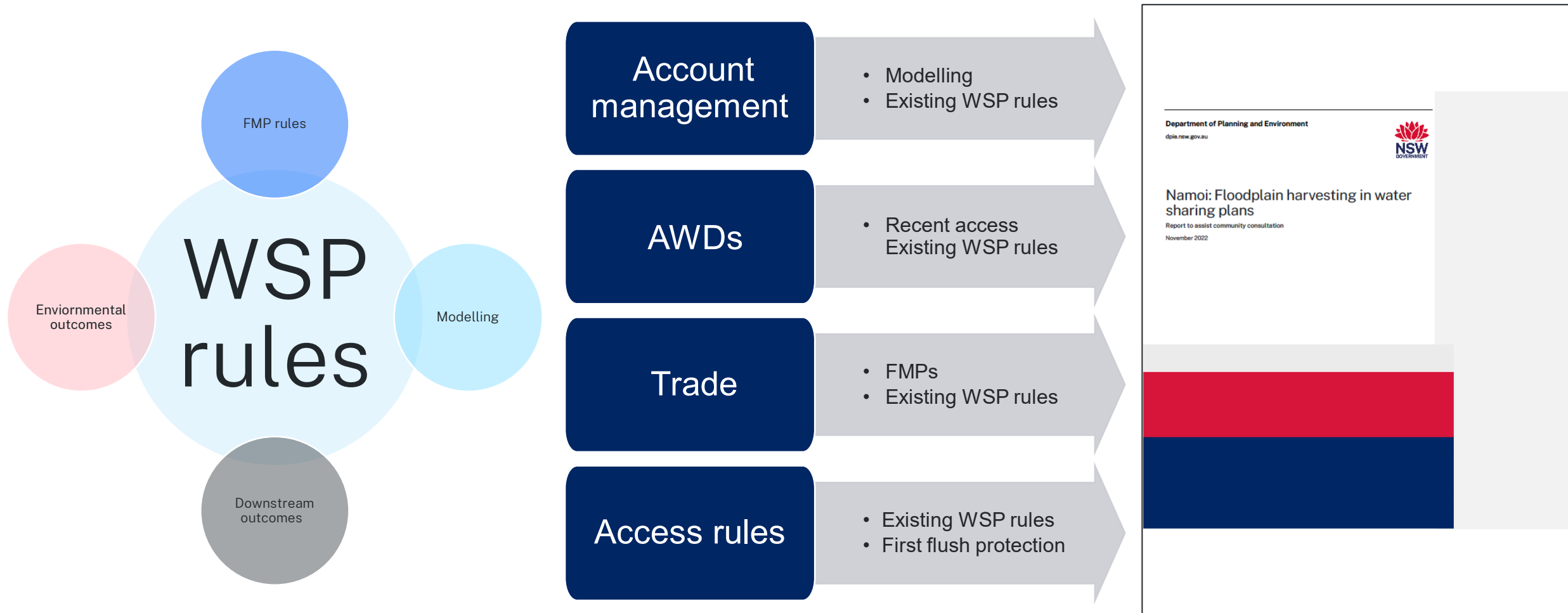
Steve Rossiter



Floodplain harvesting rules – Namoi

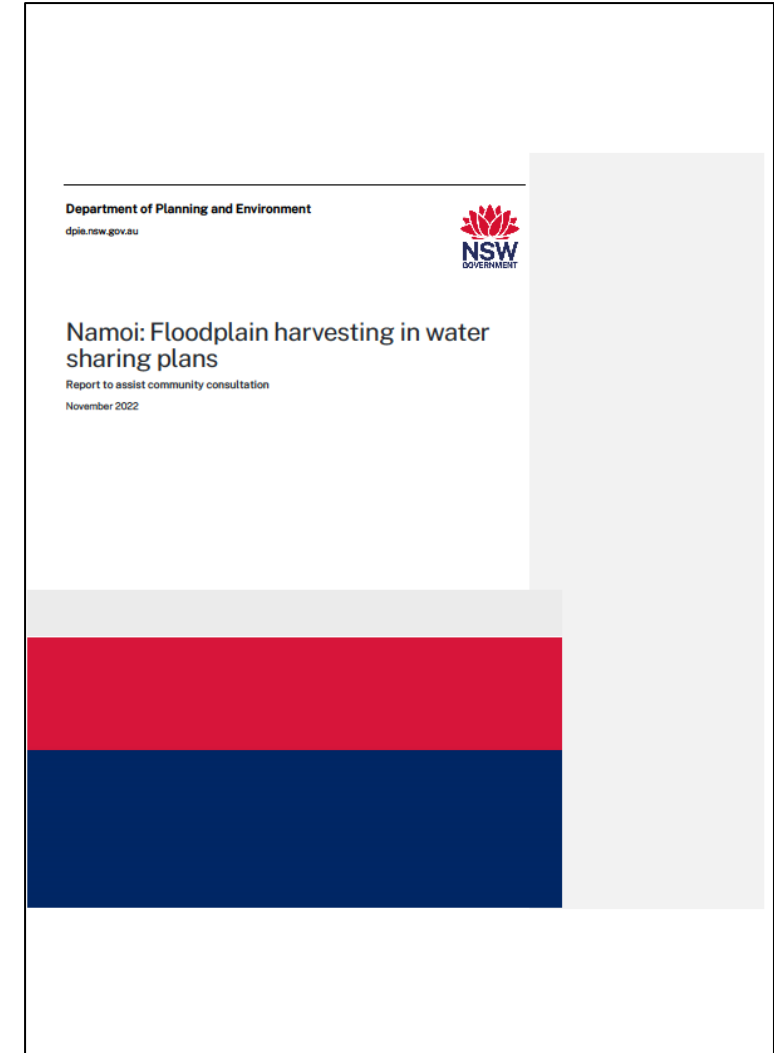
Dan Connor, Director Floodplain Management

Report to assist community consultation – the rules



Water sources and floodplains

Floodplain harvesting (regulated river)	Floodplain harvesting (unregulated river)
Lower Namoi Regulated River Water Source	Namoi Unregulated River Water Sources
Lower Namoi Valley Floodplain	Lower Namoi Valley Floodplain
Upper Namoi Valley Floodplain	Upper Namoi Valley Floodplain
Gwydir Valley Floodplain	



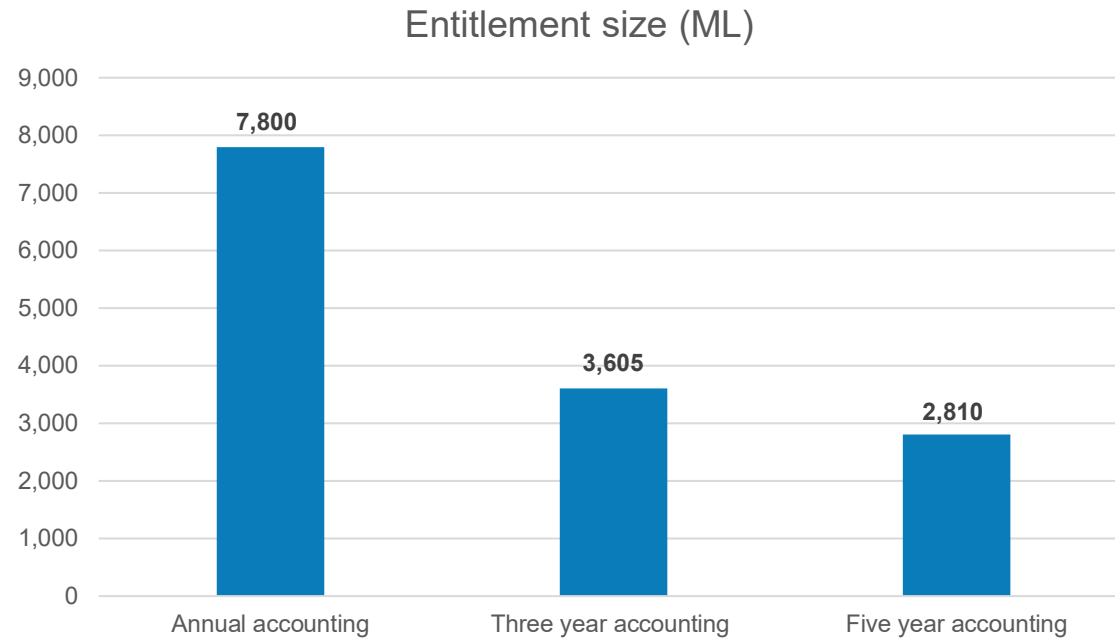


Floodplain harvesting rules – Namoi regulated

Dan Connor, Director Floodplain Management

Account management rules

Annual vs 3-year vs 5-year



Short accounting = large entitlements

Large entitlements = growth potential

Large entitlements = impacts in wet years only

Allocations

Account initialisation of 1 ML per unit share

Maximum of 1 ML per unit share each year

Allocation = X ML per unit share



WAL1 – 100 shares WAL 2 – 200 shares

Trade rules

Basin Plan 2012

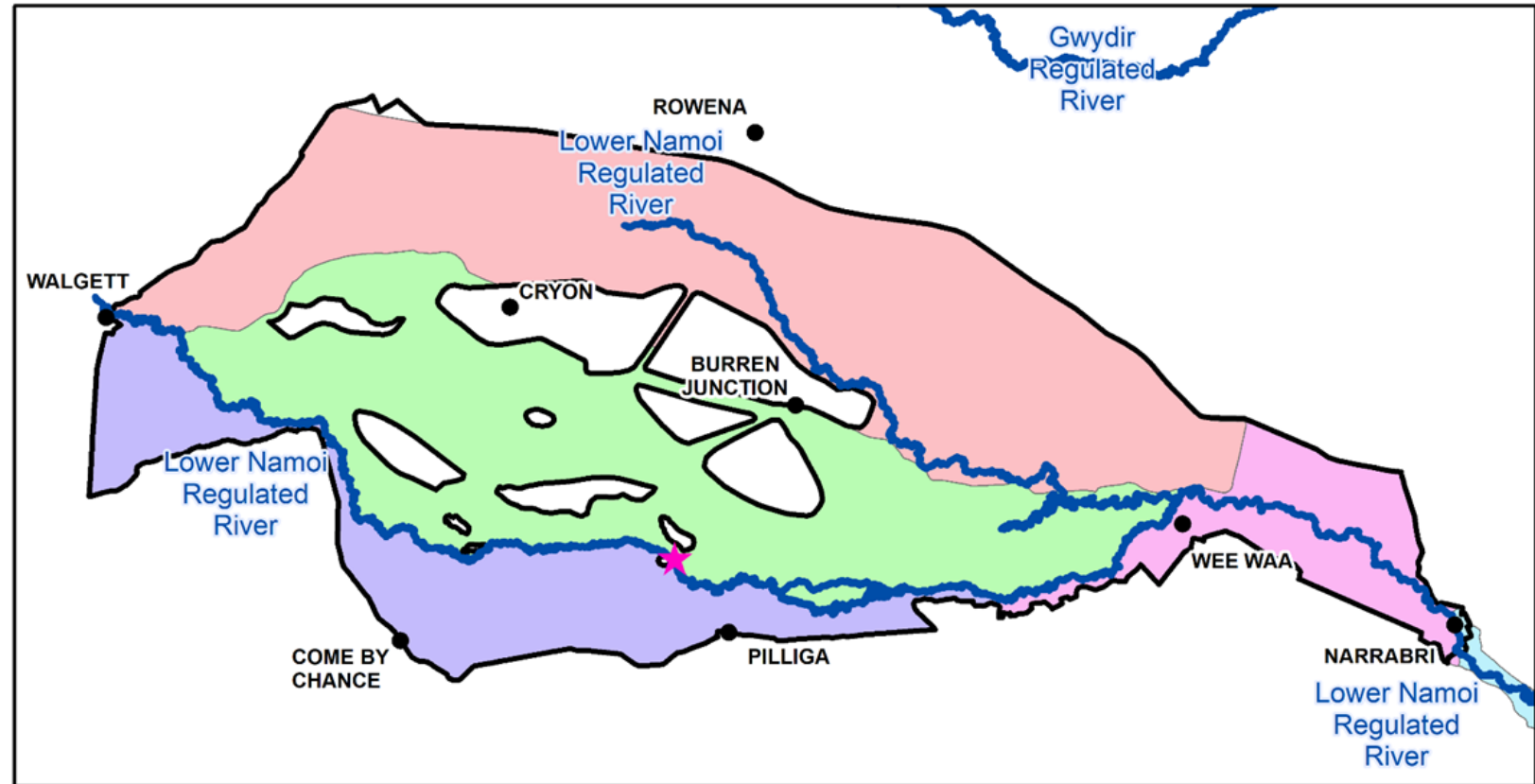
“Free trade of surface water is required except where establishing a restriction is required due to a physical constraint, lack of connectivity, or the environment may be harmed.”

In establishing trade rules the department is intending to:

1. prevent concentration of entitlement that may impact sensitive environmental areas, and
2. protect areas important for flood flow connectivity or that contain identified environmental or cultural assets

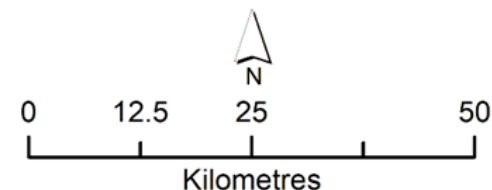
Trade rules – preventing concentration

- Based on existing water source boundaries
- Grouped to provide meaningful trade opportunities

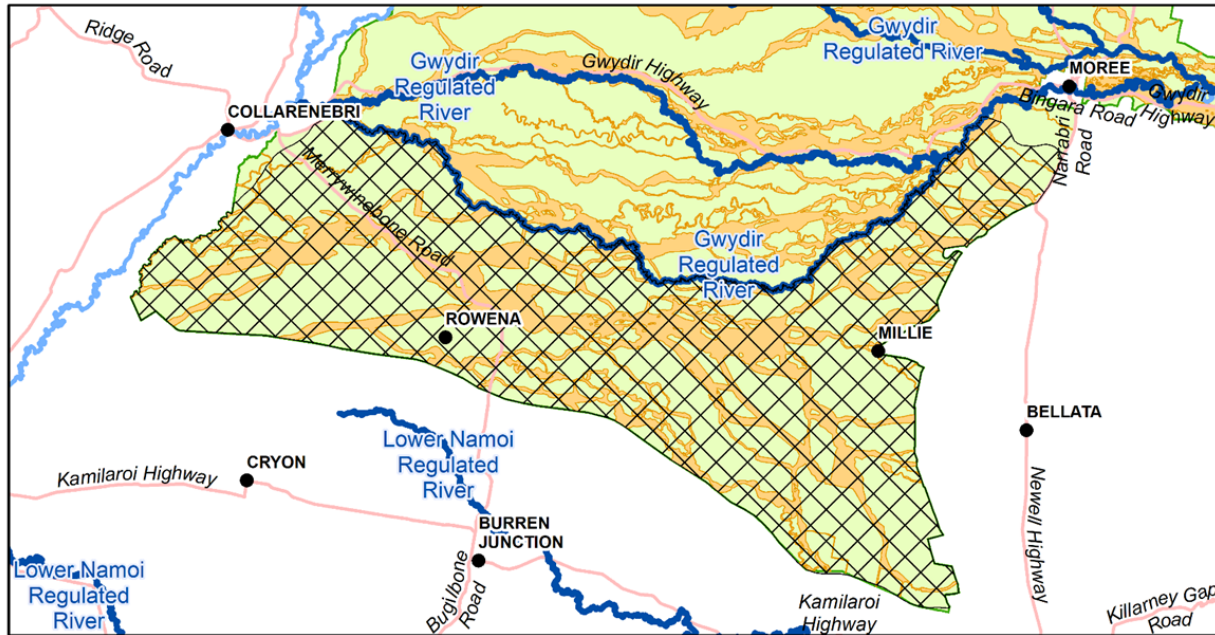


Legend

- | | |
|--|-------------------------------------|
| ★ Bugilbone Gauge (419021) | Baradine Etoo Management Zone |
| ● Town | Lower Namoi Management Zone |
| Lower Namoi Regulated River Water Source | Maules Eulah Management Zone |
| Lower Namoi Valley Floodplain | Other (Lower Namoi) Management Zone |
| | Pian Creek Management Zone |

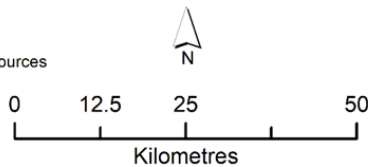


Trade rules – preventing concentration



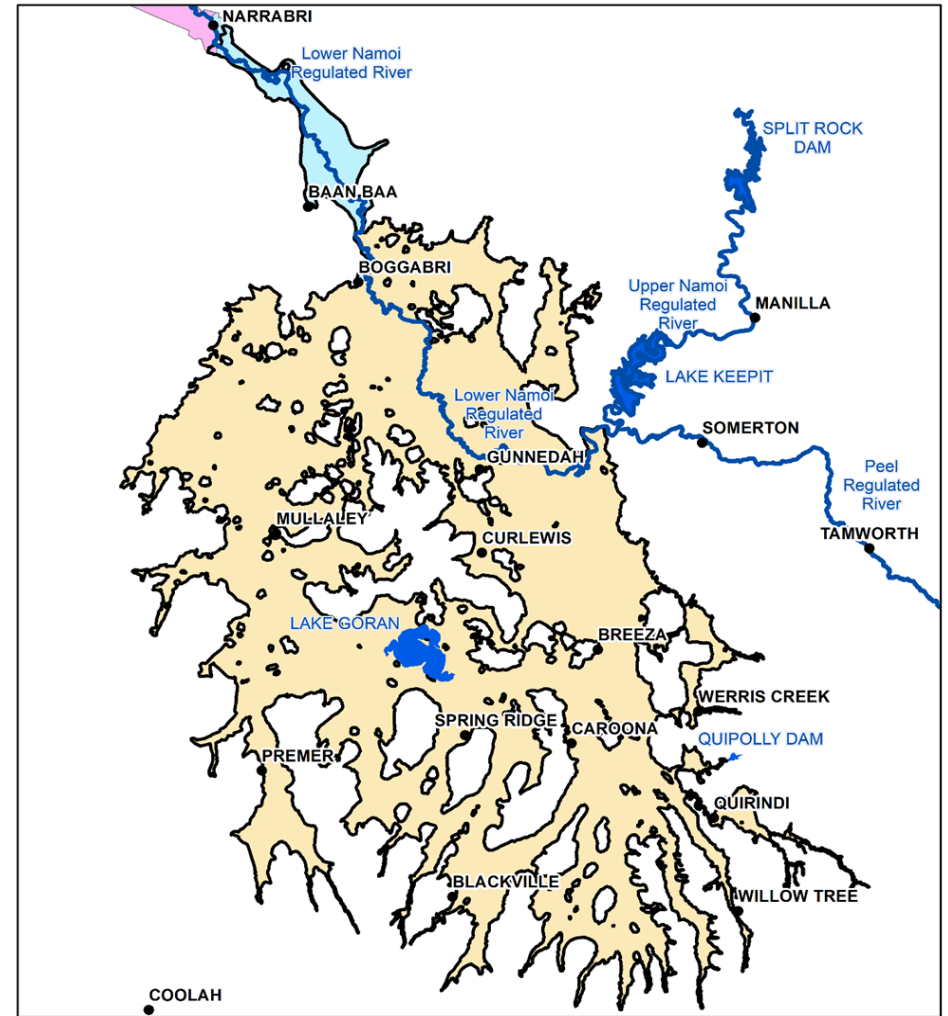
Legend

- Thalabah Creek management zone
- FMP Management Zone A
- FMP Management Zone D
- Gwydir Valley Floodplain
- Town
- Regulated River Water Sources
- Rivers (unregulated)
- Major road



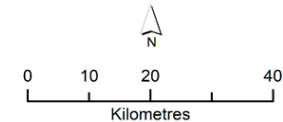
Completion Date: 3/11/2022

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Legend

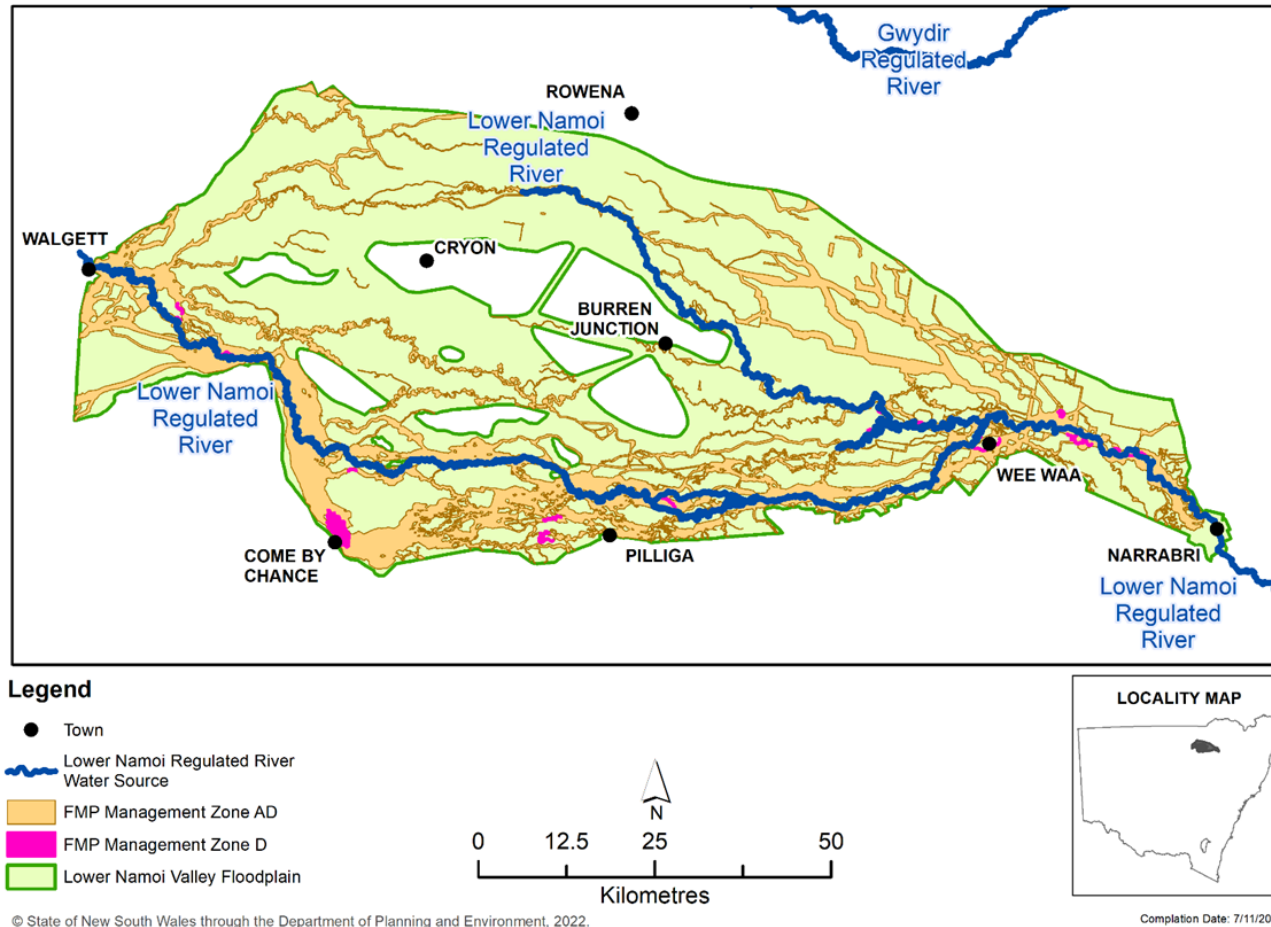
- Town
- Regulated River Water Sources
- Reservoirs and Lakes
- Upper Namoi Valley Floodplain
- Maules Eulah Management Zone
- Other (Lower Namoi) Management Zone
- Other (Upper Namoi) Management Zone



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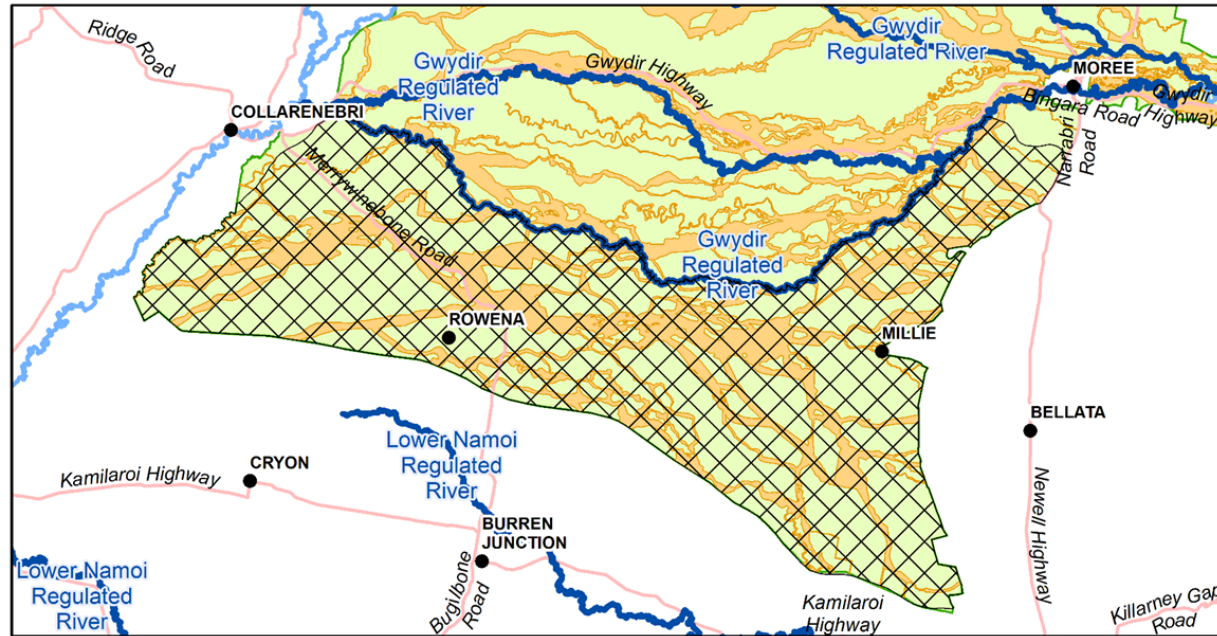
Completion Date: 7/11/2022

Rules – protecting identified areas



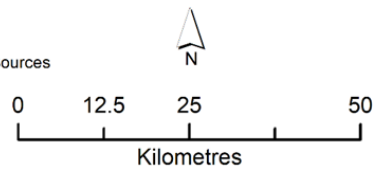
- Based on floodplain management plan zones
- No new works or increased capacity to take from the zone

Rules – protecting identified areas



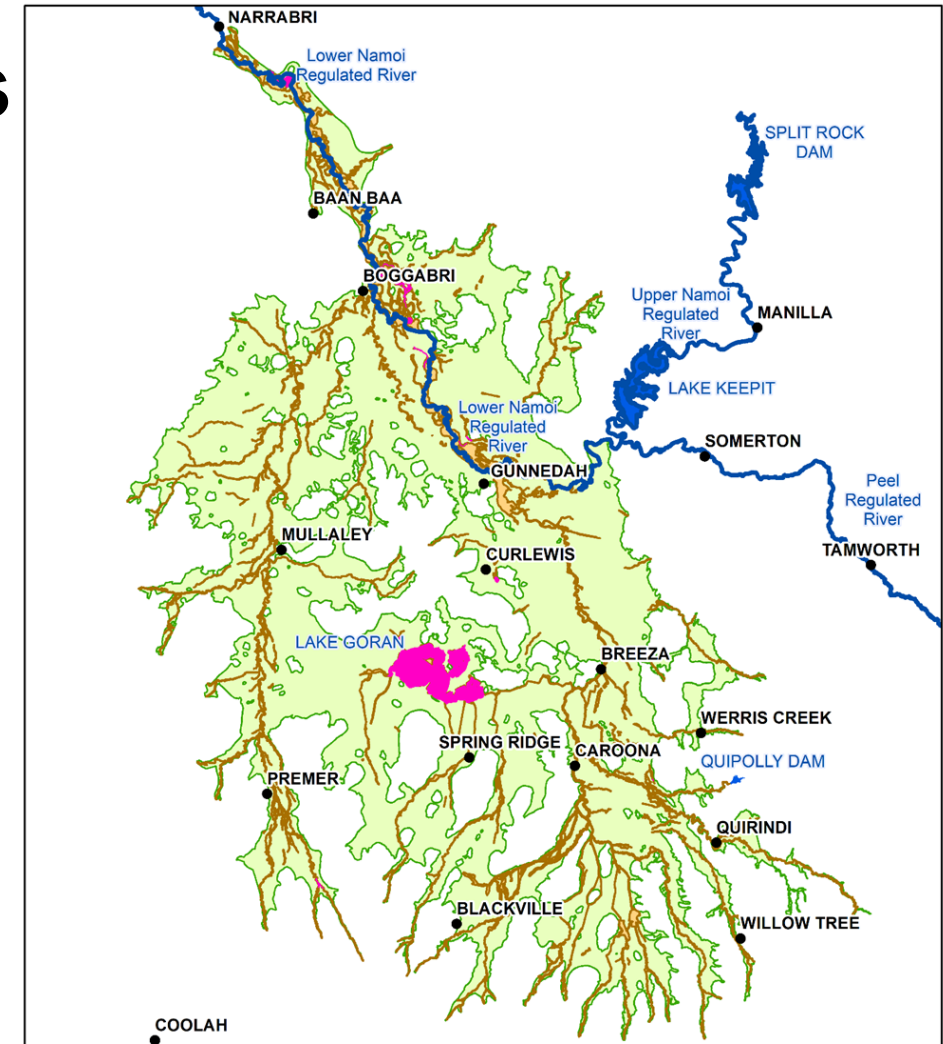
Legend

- Thalabah Creek management zone
- FMP Management Zone A
- FMP Management Zone D
- Gwydir Valley Floodplain
- Town
- Regulated River Water Sources
- Rivers (unregulated)
- Major road



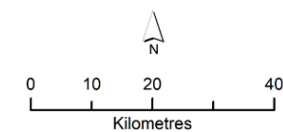
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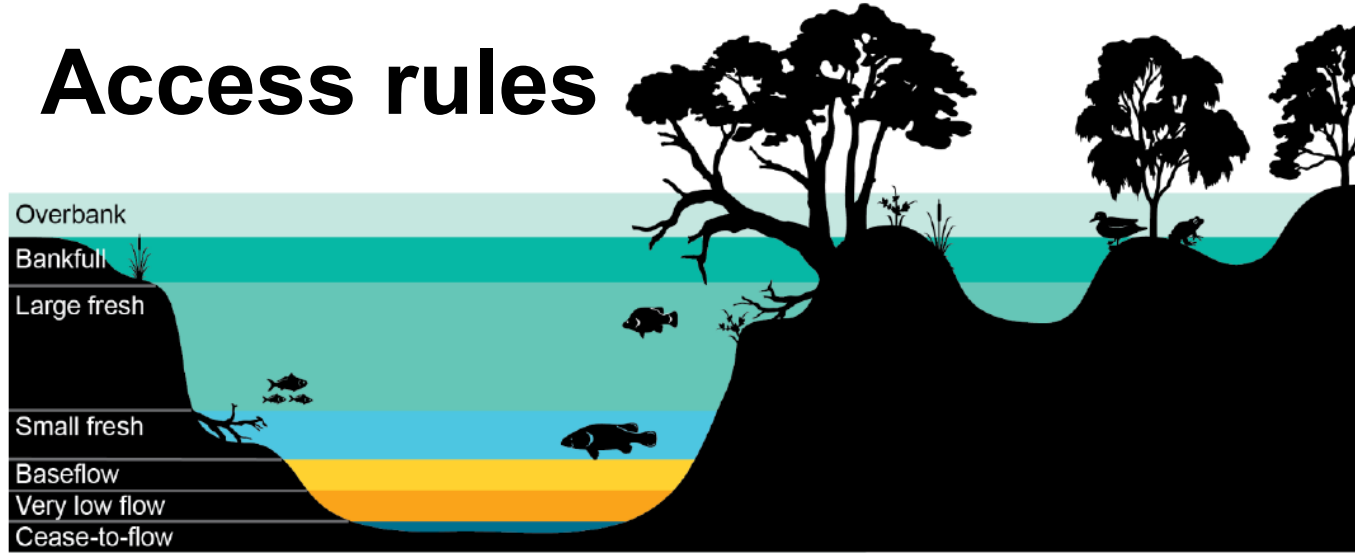
- Town
- Regulated River Water Sources
- FMP Management Zone AD
- FMP Management Zone D
- Reservoirs and Lakes
- Upper Namoi Valley Floodplain



Completion Date: 7/11/2022

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Access rules



Planning Unit	Gauging site and number	Low flows		Fishes			Bankfull and overbank	
		Very low flow	Baseflow	Small	Large	Anabranch Connection	Bankfull	Small overbank
Regulated Namoi Management Area								
Keepit to Boggabri	Namoi River d/s of Keepit Dam (419007)	5–200	200–500	500–1400	1400–3500	-	3500–6150	6150 +
	Namoi River at Gunnedah (419001)	1–200	200–600	600–5400	5400–32,700	4600–32,700	32,700–40,000	40,000 +
Boggabri to Wee Waa	Namoi River at Boggabri (419012)	1–150	150–350	350–3600	3600–17,750	4600–17,750	17,750–22,000	22,000 +
	Namoi River at Mollee (419039)	1–200	200–500	500–6000	6000–18,750	-	18,750–21,750	21,750 +
Wee Waa to Barwon River	Namoi River at Bugilbone (419021)	1–150	150–350	350–3200	3200–9900	4500–9900	9900–13,400	13,400 +
	Namoi River at Goangra (419026)	1–25	25–65	65–1000	1000–5800	-	5800–8200	8200 +
	Namoi River upstream of Walgett (419091)	1–30	30–200	200–2250	2250–8500	-	8500–10,600	10,600 +
Pian Creek Water Source	Pian Creek at Waminda (419049)	1–50	50–100	100–250	250–900	-	900–2150	2150 +

- Objective
 - assist in protecting ‘first flush flows’
 - reduce future reliance on s.324 restrictions
- Rule: restrict take when:
 - Menindee Lakes is below 195 GL,
 - and there is less than 4,500 ML/day of flow @ Bugilbone gauge
- **Amendment provisions require a review prior to 30 June 2025**



Source: Namoi LTEWP



FPH Rules – Namoi Unregulated River

Dan Connor, Director Floodplain Management

Floodplain harvesting: unregulated rivers



Volumetric Conversion - the next stage

A booklet for landholders
with licences on unregulated
rivers in NSW

- Completes volumetric conversion process for unregulated river water sources
- Restores equity in volumetric conversions across all forms of surface water access
- All conversions based on maximum irrigated areas: 1993-99
- Key difference:
 - Unregulated river conversions based on landholder survey
 - Floodplain conversions based on remote sensing analysis



Account management rules

Same licence process as unregulated river = same accounting rules

- *Take limit:* 3ML/unit share over 3 consecutive years
- *Account limit:* 3ML/unit share at any time



Allocations

Account initialisation of 1 ML per unit share

Maximum of 1 ML per unit share each year

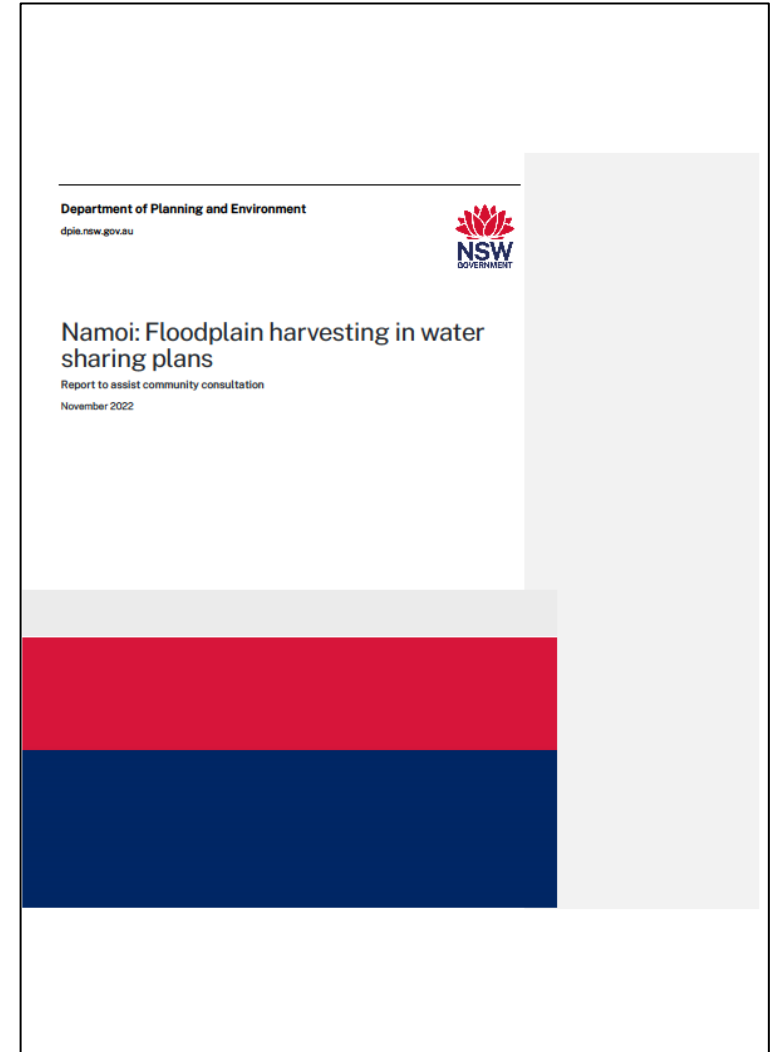
Allocation = X ML per unit share



WAL1 – 100 shares WAL 2 – 200 shares

Trade Rules

- Reflect those currently applied to unregulated river licences, *plus*
- Reflect those proposed for floodplain harvesting (regulated)
 - within designated floodplain
 - no new works in management zones AD and D
- Supported by rules for granting or amending of approvals





HAVE YOUR SAY

Submit your online feedback

Water sharing plan rules for floodplain harvesting at:

www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/water-sharing-plan-rules

Submissions will be accepted until 11.59 pm, Sunday 29 January 2023.

Late submissions will not be accepted.



Questions and Answers

Steve Rossiter



Namoi – LTAAEL compliance

Allan Raine, Director Water Planning Implementation

What's LTAAEL?

Long-term average annual extraction limit

- Described in the Namoi regulated Water Sharing Plan

29 Volume of the long-term extraction limit

(1) This Plan establishes a long-term extraction limit for these water sources being the lesser of:

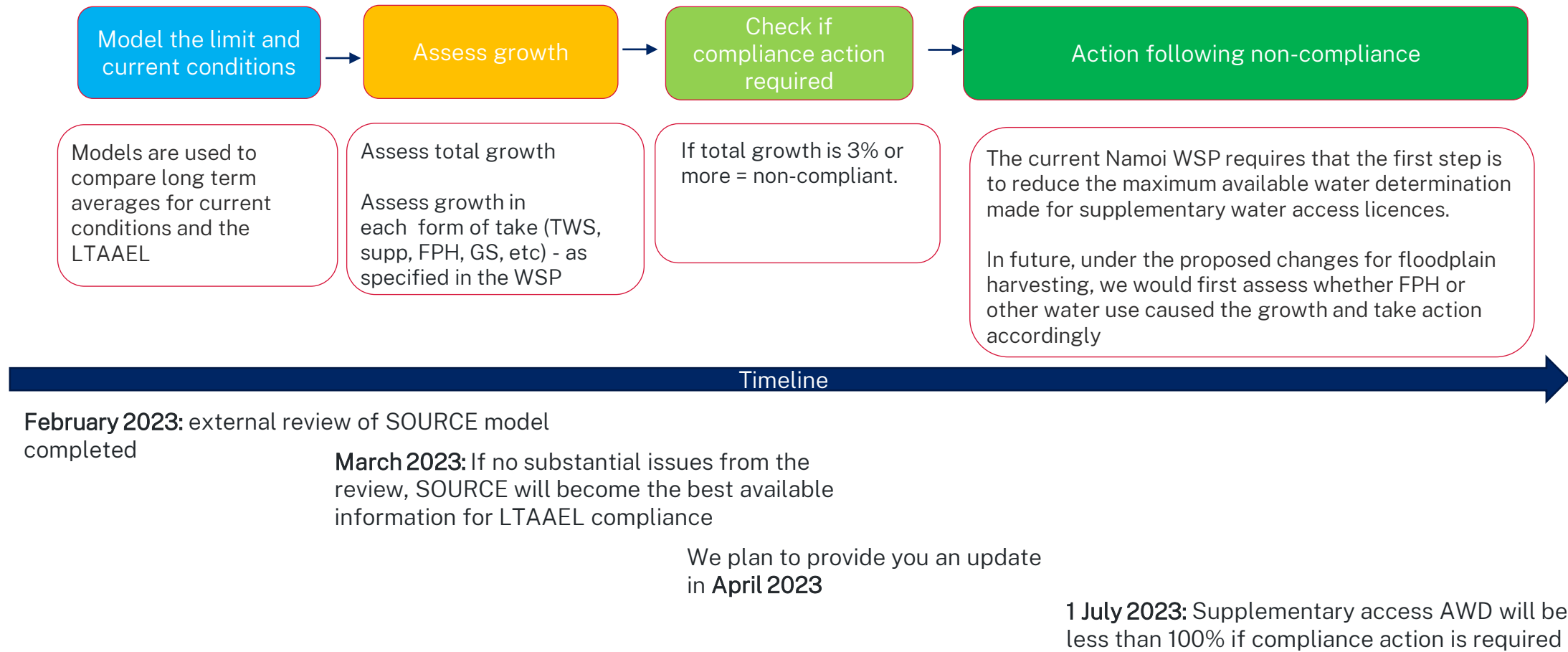
- (a) the long-term average annual extraction from these water sources that would occur with the water storages and water use development that existed in 1999/2000, the share components in this water source that existed on 1 July 2004 and the water management rules that were defined in this Plan on 1 July 2004, or
- (b) the long-term average annual extraction from these water sources that would occur under Cap baseline conditions.

Not related to compliance for individual licence holders



Question	Answer
If we only use what is allocated in our accounts, how can we have exceeded limits?	In the NSW MDB, SDLs and LTAAELs are based on historic levels of development. This means these limits can be exceeded even if all individuals are only taking what has been allocated to them. If the limits are exceeded, we may need to change allocations or take other actions as described in our water sharing plans.

Next steps



Question	Answer
<p>Under the Murray Darling Basin Cap, there were large credits. Doesn't this mean that we use less than allowed?</p>	<p>Compliance with LTAAEL and SDL is still required. We expect that there would be credits under the Cap because our water sharing plans set out new rules for sharing, including more water for the environment. These rules form part of the new limits; the LTAAEL and the SDL.</p>

Question	Fact
<p>We haven't extracted much water this year so how is it possible to have exceeded limits?</p>	<p>We often refer to the SDL and LTAAEL as a long term average number. But, when we assess compliance we aren't comparing a single year to that average. Both methods take into account expected variations in water use.</p> <p>SDL compliance uses a model to estimate permitted take and is a cumulative assessment from 2019 (or WRP accreditation date). LTAAEL compliance is assessed using long term model comparisons.</p>

Why aren't SDL and LTAAEL compliance outcomes always the same?

- different periods of time and triggers (SDL starting in 2019.)
- reported at different spatial scales (SDL combines reg and unreg)
- include different types of water use (SDL includes all water use except HEW)

For further information: [Extraction limits - Water in New South Wales \(nsw.gov.au\)](https://www.industry.nsw.gov.au/water/allocations-availability/allocations/how-water-is-allocated/extraction-limits)

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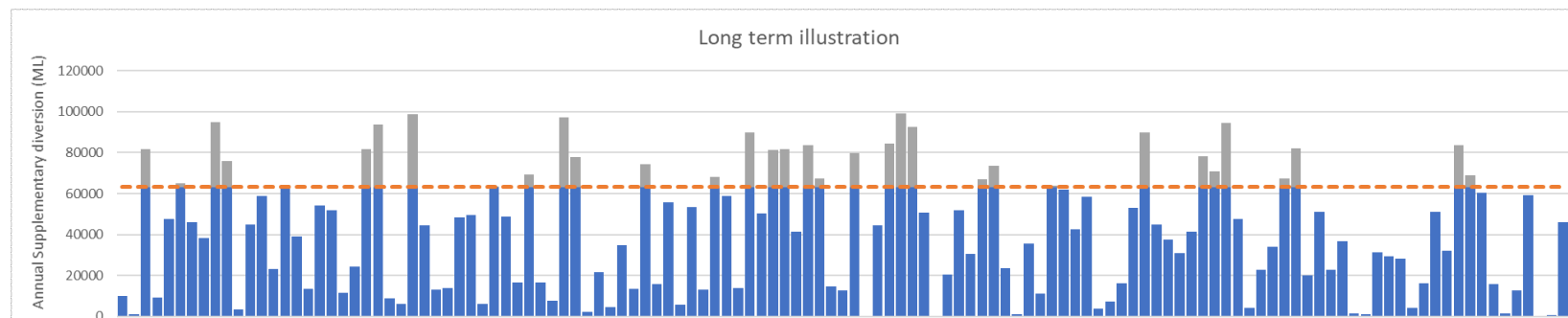
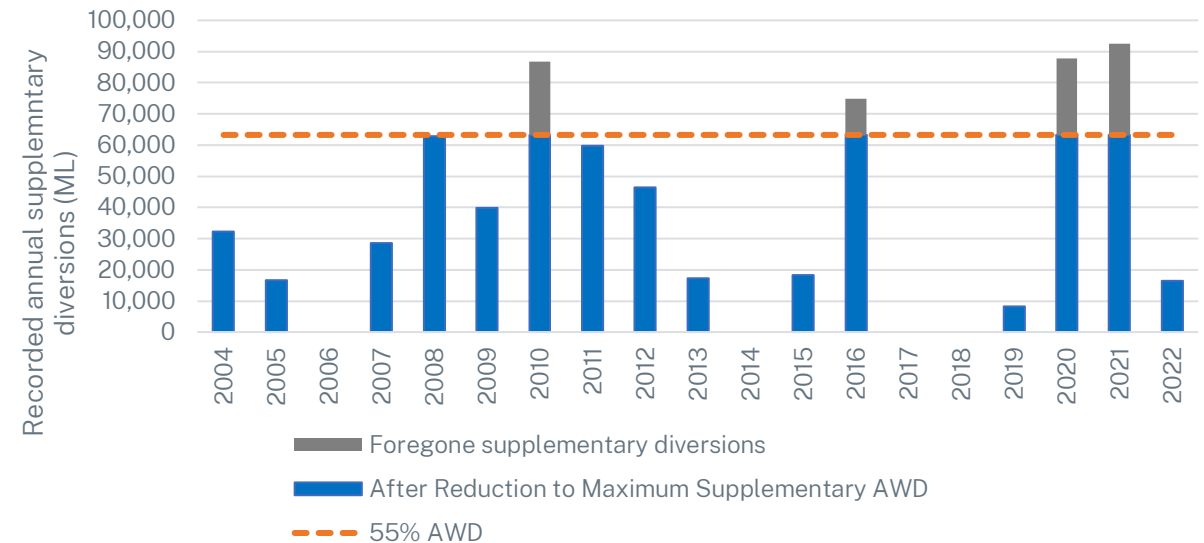
Illustration of growth in use action through Supplementary AWD reduction

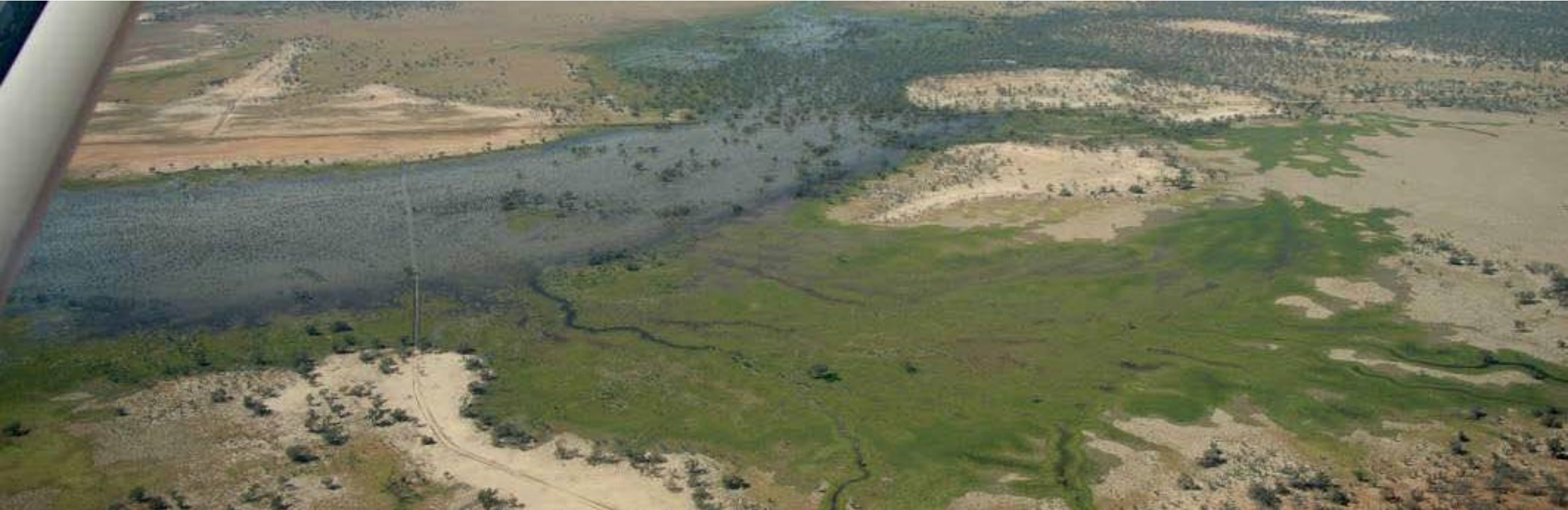
Historically Supplementary receives 100% AWD at the start of water year for the Namoi.

Reduction is only effective when surplus water is more than AWD. In most years the AWD has no impact.

In the example, 45% reduction (55% AWD) only has an effect in 4 out of 19 years.

High variability over the years means large AWD reduction is required to remove growth and bring it back to the limit.

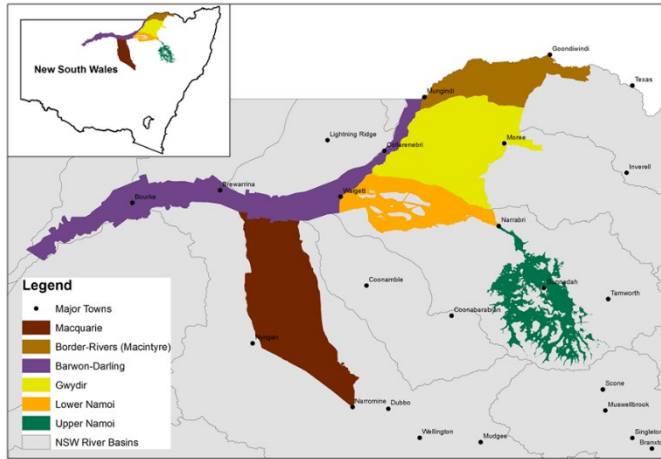




FPH measurement requirements

Allan Raine, Director Water Planning Implementation

2. Where will the floodplain harvesting measurement apply?



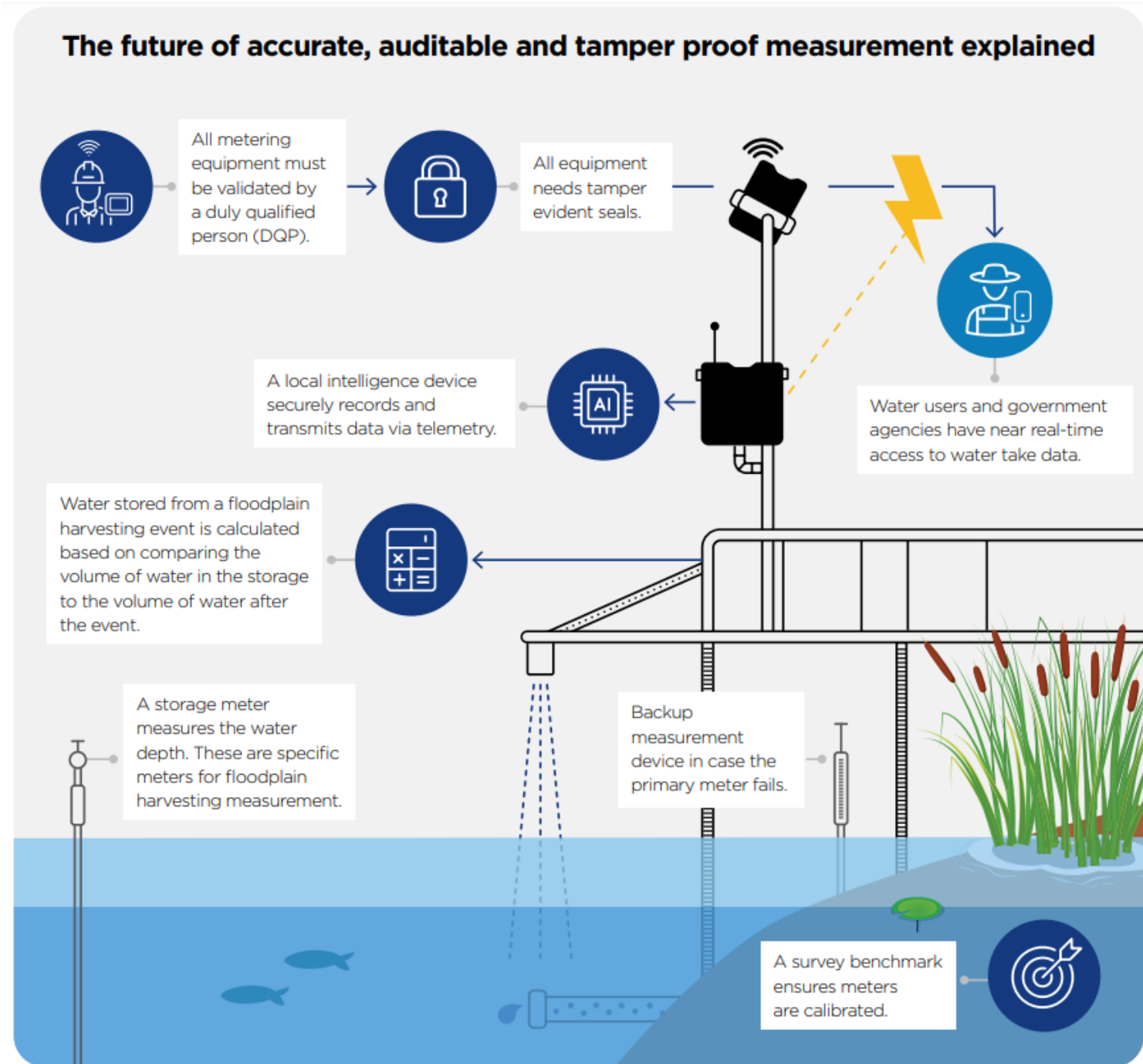
Valley	Storages
Gwydir Valley	324
Border Rivers	110
Macquarie	178
Barwon Darling	86
Namoi	447

Approx. 1,145 storages across northern valleys

Landholders have 12 months to install 'primary metering equipment'.

Landholder can use 'secondary metering equipment', such as a gauge board, if they wish to floodplain harvest during that time.

3. Measurement in practice



4. Measurement methods

Floodplain harvesting occurs when water is either collected and impounded in an on-farm storage or is directly used.

There are 2 ways you can measure floodplain take:

- at the storage method OR
- point-of-intake method.



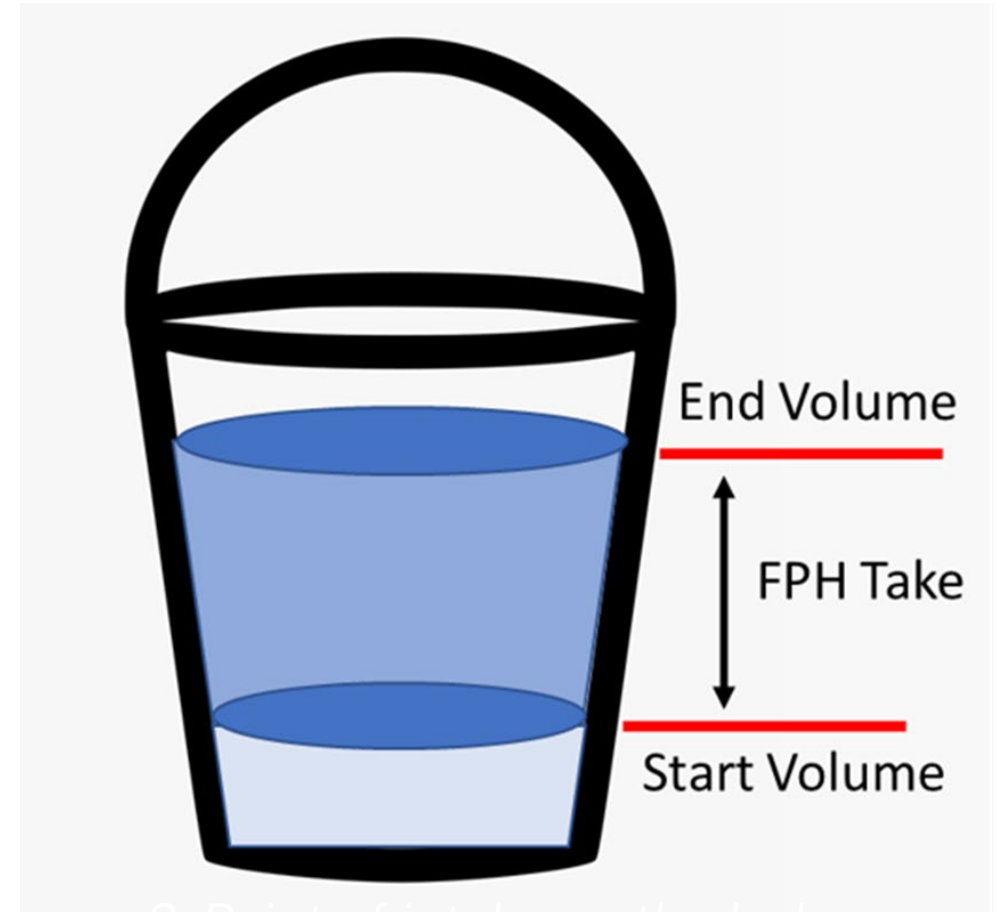
5. Measurement period

The measurement period ***STARTS*** when overland flow:

- Starts filling a storage, or
- Mixes with water on the property.

The measurement period ***STOPS*** when water is no longer flowing into a storage and all other buffer zones are empty.

Landholder nominate the beginning and end of a measurement period in iWAS.



6. Steps required to measure

1. Survey benchmark and storage curve
2. Primary metering equipment – storage meter and local intelligence device (LID)
3. Secondary metering equipment (optional)
 - Gauge board, or
 - Another approved system such as a storage meter



Floodplain harvesting – further information



Websites

<https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/measurement>

<https://www.dpie.nsw.gov.au/water/nsw-non-urban-water-metering>

Enquiries

metering.reform@dpi.nsw.gov.au

floodplain.harvesting@dpi.nsw.gov.au

Questions and Answers

Steve Rossiter



Thank you

For more information, please visit

<https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project>

<https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/faqs>

To contact us

floodplain.harvesting@dpie.nsw.gov.au