FIFTEEN50

Department of Planning, Industry and Environment

Floodplain Harvesting Measurement Strategy: focus group analysis

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Report for Department of Planning, Industry and Environment

Floodplain Harvesting Measurement Strategy: focus group analysis

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GLOSSARY

Acronym	Definition
AWAS	Australian Water Accounting Standards
BLR	Basic Landholder Right
DAS	Data Acquisition Service
DPIE	Department of Industry, Planning and Environment
FPH	Floodplain Harvesting
IP	Intellectual property
i-WAS	NSW Water accounting system
ML	Megalitre (one ML = one million litres)
NRAR	NSW Government Natural Resources Access Regulator
Strategy	Draft Floodplain Harvesting Measurement Strategy
WAL	Water Access Licence
WIP	Works Infrastructure Plan

1. Introduction

Fifteen50 Consulting was engaged by the Department of Planning, Industry and Environment (Water Group) to convene and lead industry focus group workshops to provide feedback and advice on the draft Floodplain Harvesting Measurement Strategy ('the Strategy').

1.1 Background

The NSW Government has committed to licensing and measuring water take via floodplain harvesting (FPH). This has been a challenging task to date given the variable nature of floodplain take and the operation of other irrigation sources and infrastructure.

With the planned release of floodplain harvesting Water Access Licences in 2020, a measurement strategy needs to be developed to monitor floodplain take in accordance with individual licenced volumes and catchment limits set out in relevant water sharing plans. This will provide for a fair system of floodplain access and a reliable water supply for downstream users.

The Strategy applies state-wide across NSW however the initial roll out is limited to the five northern valleys where floodplain harvesting accounts for a significant proportion of the overall consumptive take of water. These valleys are:

- Border Rivers [51 properties, 132 storages]
- Gwydir [152 properties, 403 storages]
- Namoi [258 properties, 544 storages]
- Barwon-Darling [44 properties, 117 storages]
- Macquarie [99 properties, 180 storages].

Whilst the Department has discussed key components of the Strategy at several consultation forums, in-depth feedback is required to flesh out potential technical and implementation issues and to ensure the measurement system can be rolled out in the smoothest way possible.

The Department engaged Fifteen50 Consulting as an independent facilitator with technical expertise to convene small focus group workshops to address industry concerns in a structured way.

1.2 Project objective

The Department aims to ensure that the Strategy is practical, fit-for-purpose and can be implemented for both small and large irrigation operations across a range of locations. In pursuit of this, the Department sought feedback from a representative sample of affected landholders and industry representatives via small focus group workshops. These workshops were required to be facilitated by a technical expert with subject matter expertise and an objective and independent perspective.

The objective in the use of an independent technical expert was to thoroughly and critically examine feedback received to apply specialist knowledge to provide a set of suggested actions for consideration by the Department to improve the Strategy. Fifteen50 Consulting provided qualified (water resource) engineers to undertake this specific role.

1.3 Project scope

As the independent facilitator, Fifteen50 was required to:

- Select workshop participants from landholders eligible for a floodplain harvesting licence
- Develop workshop materials simulating a range of on-farm irrigation scenarios to test the Strategy's assumptions and technical areas of concern
- Independently convene and chair workshops to gain objective feedback on Strategy gaps, challenges and alternative approaches/solutions
- Report on feedback received with suggestions to improve the Strategy, in alignment with the Strategy's objectives and the NSW Floodplain Harvesting Policy 2018.

The Department provided relevant project literature to Fifteen50 along with contact details of landholders eligible for a floodplain harvesting licence, via a confidentiality agreement, in order to inform project delivery.

2. The Strategy

The key aspects of the draft Strategy, as current at the time of the workshops, are described below:

- Landholder to nominate the start and end of the FPH event (the taking of FPH water outside of nominated events is an offence)
- Point of measurement at the permanent on-farm storage using telemetered, continuous depth measurement related to volume (storage depth-volume relationship curve)
- Landholder to undertake accounting using farm storage data to determine volume of FPH take in a nominated event using this equation:
  - *FPH take = Storage increase ML + Take into field storage ML – Take under other licences ML during the measurement period*
- FPH take into temporary storages to be estimated, using an agreed methodology, with the option for metering.

The Department also advised Fifteen50 that, in response to strong feedback from stakeholders during state-wide consultation in September 2019, runoff from developed irrigation areas is considered floodplain harvesting only at the time when it is being taken in conjunction with other floodplain harvesting water external to the developed irrigation area. This qualification was presented and discussed with workshop participants.

The broader aspects of the Strategy have been categorised and detailed further in order to guide workshop facilitation and align feedback from participants, as described in Table 1 below.

Strategy implementation

As set out in the Department's Floodplain Harvesting Action Plan (September 2019), enforcement of the floodplain harvesting licencing framework is scheduled to begin in July 2021. Prior to this date the Strategy must be implemented and all storages used for the take of FPH water instrumented for data collection.

Table 1: Strategy aspects

Strategy aspect	Metric	Guidance on how to measure
Measurement methods		
	• Practical	• Balance between implementation and on-going effort • Robust framework for application
	• Cost-effective	• Cost of implementation • Equity / fairness
	• Safe implementation	• Qualified persons to install metering
Data quality		
	• Integrity of data	• Accurate, reliable and tamper proof
	• Informs farming decisions	• Data to / from farm (telemetry) • Data useful for farm management
	• Landholder calculations	• Data needs qualification for movements in storage level
	• Program evaluation	• Aims to measure more than 90% of FPH take
Data quantity		
	• Identification of triggers for compliance	• Withstand public scrutiny • Continuous calibration of data sets

3. Methodology

The project methodology applied by Fifteen50 is summarised below.

3.1 Workshop and participant selection

In conjunction with the Department, Fifteen50 scheduled four workshops in locations representative of the five nominated Basin valleys to maximise accessibility to participants. A unique group of willing participants was selected for each workshop according to the following criteria:

- Range in size of irrigation operation (small to large area)
- Range in geographic location – upper, middle and lower valley position
- Good operational knowledge of floodplain harvesting measurement
- Demonstrated engagement in the floodplain harvesting licensing program.

Fifteen50 contacted each selected participant initially via phone and subsequently in writing via email. A copy of the information document sent to participants explaining the objectives of the workshops is included in Appendix A.

(It is worth noting that none of the invited participants declined involvement, indicating that the floodplain harvesting community is highly engaged in the development of the licensing program.)

Workshop participant numbers were limited to 8-10 in order to allow for a deeper conversation and discussion about practical issues of the draft Strategy among a small group of individuals. As the participants are those directly affected by the Strategy, with independent facilitation by technical experts, a more equitable evaluation and nuanced understanding of the program's impact was gained. The workshops were conducted as follows:

- Moree – 10th December 2019 (10am-3pm)
  - Eight participants; representatives from industry groups including:
    - Border Rivers Food and Fibre
    - Gwydir Valley Irrigators Association
    - Barwon-Darling Water
    - Namoi Water
    - Macquarie River Food and Fibre
    - MDBA Basin Community Committee
- Moree – 11th December 2019 (10am-3pm)
  - Ten participants; eligible FPH landholders from the Gwydir, Border Rivers and upper Namoi valleys
- Walgett – 12th December 2019 (10am-3pm)
  - Eight participants; seven eligible FPH landholders from the Barwon-Darling / lower Namoi valleys and one representative from Barwon-Darling Water
- Dubbo – 13th December (10am-3pm)
  - Eight participants; seven eligible FPH landholders from the Macquarie valley and one representative from southern NSW irrigation regions.

Two to four Departmental staff, from the Healthy Floodplains Project team, associated with Strategy development attended each of the workshops as observers. Their presence as observers was intended to gain a first-hand understanding of property-owner feedback without infringing on the independent nature of the engagement.

3.2 Workshop structure and materials

Fifteen50 prepared materials in consultation with the Department to prepare informed and identical materials for each of the workshops. Fifteen50's review of the Strategy and identified issues informed the categorisation and assessment of concerns for specific interrogation as part of the workshop and case study scenarios.

Draft workshop materials and ten case study farm scenarios were tested with Department staff to ensure the objectives of the project were met, with feedback adopted by Fifteen50 in finalisation.

The five-hour workshops were facilitated by water resource engineers Dean Delahunty and Nathan Heinrich, as per the structure below:

- Introduction
- Presentation of the background to Strategy, policy mandates and workshop objectives
- Facilitated discussion – key issues with floodplain harvesting measurement
- Presentation and discussion of the Strategy and key elements
- Application of the Strategy to real-life case study scenarios (interactive session)
- Facilitated discussion of implementation challenges and improvement opportunities
- Summary of key outcomes and feedback.

A copy of the presentation used in the workshops is given in Appendix B. This copy excludes the case study scenarios examined in order to preserve landholder confidentiality.

Detailed minutes from the workshops were taken by both Dean and Nathan.

4. Workshop feedback

Individual feedback from each workshop is described in Appendix C, along with Fifteen50's response, analysis and conclusions drawn. It is noted that where there is an absence of feedback on specific aspects of the Strategy, this can be taken to mean that the participants were generally content with the approach taken by the Department.

Table 2 and Table 3 provide a summary of Fifteen50's analysis and conclusions drawn out of the four workshops, with further analysis and development of key suggested actions given in Section 5.

Table 2: Workshop feedback – summary

Key aspect of Strategy	Industry representatives Moree	FPH landholders Moree	FPH landholders Walgett	FPH landholders Dubbo
Nomination				
Definition of start / end date	The concept of nominating the commencement time for an event was cautiously accepted but property specific elements of the concept led to a number of concerns around compliance.	The concept of nominating the commencement time for an event was embraced although there was a desire to have further guidance as to how NRAR might implement compliance.	The concept of nominating the commencement time for an event was embraced but the way of determining the end date was challenged. Nomination of end time rather than nominal period would provide flexibility to operate properties to manage FPH as one of many inputs to a farm water balance.	The concept of nominating the commencement time for an event was not universally accepted by the focus group. The driver for disagreement was a situation where a property is isolated from the floodplain (associated with flood protection works). Although nomination of a start date was cautiously accepted the way of determining the end date was challenged. FPH events in Lower Macquarie can extend for long duration and FPH activity can be stop/start based on rainfall events. Irrigation can continue while there is a flood.
	Conclusion: Participants felt that a clear set of guidelines would provide clarity for landowners around how and when to nominate the start (and define the end) of an FPH event. There was a desire for the guidelines to incorporate guidance or examples for properties where there is no physical separation of on-farm rainfall runoff, irrigation tailwater and FPH water.			
Evidence of nomination	A clear statement could be readily developed to guide landowners as to what evidentiary documentation is required to satisfy compliance requirements.	Evidentiary requirements that would satisfy compliance activities need to be clearly stated.	Evidentiary requirements that would satisfy compliance activities need to be clearly stated.	Prefer point of take measurement which is clear evidence.
	Conclusion: There was some concern around how stringently NRAR might enforce compliance of the nomination time which participants thought could be partially addressed by: • Including examples of acceptable evidentiary requirements in the guidelines for FPH event nomination. • Developing an appeal or review process as part of compliance requirements.			
Developed irrigation area runoff / Contaminated Agricultural Runoff (CAR)	Confusion surrounds developed area runoff and how it could be substantiated in cases where it occurs concurrently with FPH take. Landholders may look to install tailwater return systems for overhead irrigation areas in order to justify the capture of non-FPH developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.	Confusion surrounds developed area runoff and how it could be substantiated in cases where it occurs concurrently with FPH take. Landholders may look to install tailwater return systems for overhead irrigation areas in order to justify the capture of non-FPH developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.	Nil.	Given the change in policy concerning developed area runoff was only introduced at the focus group there was confusion surrounding this capture and how it could be substantiated in cases where it occurs concurrently with the take of FPH water. Clarity is required on the status of developed area runoff if blown out to downstream neighbour – the current definition would suggest it returns to being FPH. Communication of the policy and the specific implications to FPH activities would assist understanding of the concept. Landholders may look to install tailwater return systems for overhead irrigation areas in order to justify the capture of non-FPH developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.
	Conclusion: Developed irrigation area runoff as non-FPH is a new concept and will require significant effort to explain. Participants thought this can be assisted by: • Providing further information to clarify the definition of developed area runoff as it pertains to FPH event nomination.			

	• Qualifying the requirements to substantiate the accounting treatment of non-FPH developed area runoff (i.e. on-farm rainfall records).			
Measurement				
Point of measurement	Measurement at the storage was generally accepted, with broad support for idea that all storages should be nominated as FPH works.	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. Clarity on the function of the WIP as it pertains to monitoring is required, with landholders to be informed that only storages identified on the WIP require measurement. Further clarity on the definition of a surge area / temporary storage is also required and generally relates to the amount of time that water is detained prior to pumping to permanent storage. 21-day period for replacement of a broken meter is consistent with WaterNSW practice. There is an ability to extend this timeframe in extenuating circumstances. Landholders need to be made aware of the conditions surrounding the ability to take FPH if measurement equipment has failed, with clear guidelines on backup data collection to evidence take. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. A gauge board backup is a useful addition. Multiple cells require separate measurement and this additional burden is acknowledged however the benefits to water use efficiency outweigh the cost. Consideration should be given to alternative measurement for very small, infrequently used storages where the costs of measurement are proportionally much higher – this could be a flow meter on the pump, or a simple gauge board measured on a per event basis. This could be addressed if an outlier's pathway was included in the Strategy. 21-day period for replacement of a broken meter is consistent with WaterNSW practice. There is an ability to extend this timeframe in extenuating circumstances. Landholders need to be made aware of the conditions surrounding the ability to take FPH if measurement equipment has failed, with clear guidelines on backup data collection to evidence take. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. Multiple cells require separate measurement and this additional burden is acknowledged however the benefits to water use efficiency outweigh the cost. Measurement of infrequently used storages appears unnecessary to landholders however even if only filled once every 10 years, the cost of instrumentation is still relatively small (i.e. a few $ per ML taken). In time the market is expected to be able to maintain adequate stock of equipment for ready replacement. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.
	Conclusion: Measurement at the storage was generally accepted as a reasonable approach for FPH. Participants felt that refinements may include: • The definition of a storage vs surge area is confusing and requires further clarity. • There is a need to clarify the conditions to be applied if measurement equipment fails with clear guidelines on backup data collection system/s as evidence of FPH activity. • The repair period for storage measurement failure is considered inadequate and an temporary extension to the repair period post-implementation would be reasonable to allow local market capacity to establish and mature. • Development of a pathway in the Strategy to allow a negotiated measurement solution for properties that take FPH in a unique way.			
Cost of measurement	Nil.	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is negligible compared to the production value of the water (refer Section 5.3).	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is negligible compared to the production value of the water (refer Section 5.3).The cost of measurement may be mitigated as part of implementation with an extension to the timeframe and the use of subsidies and assistance as detailed below.	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is negligible compared to the production value of the water (refer Section 5.3). The cost of measurement may be mitigated as part of implementation with an extension to the timeframe and the use of subsidies and assistance as detailed below.
Use of gauge boards for storage measurement	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.

	Conclusion: The strong feedback from landowners is that the Department should initiate a program of gauge board installation in all FPH storages as an interim measure ahead of electronic measurement.			
Storage curve and benchmarks	Storage curves must be benchmarked to AHD for consistency and reliable/enforceable data collection. The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
	Conclusion: The overwhelming sentiment from participants was that practical steps could be implemented rapidly including: • Finalise storage curve development and issue to FPH licence holders as a matter of urgency. • Create a review, appeal and update process for landholders to challenge determination of storage curve.			
Alternative measurement	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of developed area FPH rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.	Measurement of the water lap mark is reliable, however is a manual assessment and may provide for anecdotal justification of take only when all else fails (even a gauge board). It is not particularly accurate nor practical to include as part of the Strategy. The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this. Point of take measurement will address the risk of unaccounted FPH take diverted directly to irrigation, which can be a significant volume in long flood events in the lower Macquarie Valley.
	Conclusion: Participants strongly felt that a better outcome would be achieved with flexibility in the Strategy to allow nomination of a certified point of take measurement through a fixed structure.			
Telemetry / data security	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure and maintenance cost concerns are valid. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure and maintenance cost concerns are valid. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure and maintenance cost concerns are valid. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure, poor mobile coverage and maintenance cost concerns are valid. Telemetry systems can likely be configured to go dormant during periods when the storage is empty, saving costs on transmission of meaningless data. The adoption of manual data collection by NRAR staff is not cost-effective. This feedback is valid however overreaction to frustrations with surface water metering telemetry that can otherwise be resolved technically. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user.

	• Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.	• Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.	• Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.	The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment • Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.
	Conclusion: • Overall trust in the telemetry solution was poor and participants felt that the benefits are not substantial to their property operation. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) could be resolved through a dedicated and centralised authority. • Participants expressed that the benefits of telemetry and data collection are significantly improved if landholders were able to access their data in real-time (split signal from data logger). • Participants requested that better communication of adopted data security measures be provided to landholders.			
Unaccounted FPH	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.	Properties that have a high risk of this occurring, as prevalent in the Macquarie valley, should install point of take measurement, and a pathway to allow this should be developed.
	Conclusion: Participants strongly felt that a better outcome would be achieved with flexibility in the Strategy to allow nomination of a certified point of take measurement through a fixed structure.			
Accounting				
	These issues are largely related to the difficulty in nominating the FPH event and the accounting treatment of developed area rainfall runoff. Landholders can use data to be more effective with use of water resources if data can be accessed in real-time.	These issues are largely related to the difficulty in nominating the FPH event and the accounting treatment of developed area rainfall runoff. Landholders can use data to be more effective with use of water resources if data can be accessed in real-time. Further clarification is required on the status of BLR water, the take of supplementary water and the ability to transfer between storages, as it pertains to accounting for FPH take, particularly when concurrent. Participants are unaware of the Department's position on multi-year accounting and account debit provisions (if any).	Landholders in the western division can capture all rainfall runoff and this may present a complication to the Strategy regarding developed area non-FPH runoff. Further clarity on BLR take is required as wells as clarity for landholders whose FPH works take water passively and how this is to be addressed when licenced volume has been exhausted.	Guidelines for accounting are required to provide landholders with clarity on allowable deductions. These guidelines could be incorporated into the iWAS reporting system in order to simplify the process. Further clarification is required on the status of BLR water, the take of supplementary water and the ability to transfer between storages, as it pertains to accounting for FPH take, particularly when concurrent. Participants are unaware of the Department's position on multi-year accounting and account debit provisions (if any).
	Conclusion: The accounting requirements associated with the Strategy were discussed in detail through examples and ideas to make the Strategy more acceptable to the participants included: • Provision of further information to clarify the definition of developed area runoff regarding FPH event nomination. • Clarification of the status of BLR water, the take of supplementary water and the ability to transfer between storages, as it pertains to accounting for FPH take.			

	• Provision of clarity on how uncontrolled FPH take into passive storages is to be addressed when licenced volume is exhausted. • Provision of clarity on the adoption or otherwise of multi-year accounting and ability to go into account debit. • Clarification of the status of BLR water as it pertains to accounting for FPH take in the western division where all rainfall runoff can be captured.			
Temporary storages				
	Temporary storage, or field storage, was viewed as being rare and does not account for a large volume of current take. Any structure that stores water should be measured.	Temporary storage, or field storage, was viewed as being rare and does not account for a large volume of current take. Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage, which generally relates to the amount of time that water is detained prior to pumping to permanent storage.	Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage.	Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage.
	Conclusion: Participants felt that the inclusion of temporary storage in the Strategy would be improved by: • Clear definition of the difference between a surge area / temporary storage and an FPH storage. • Clear identification of all storage areas on-farm in the WIP, whether long-term or otherwise, for measurement. • Clear definition of what constitutes temporary storage as compared to a long-term storage or a surge area.			
Implementation				
Approach to implementation	The current approach to implementation saw a lot of discussion and feedback. This was interpreted to mean that there is broad acceptance of measurement and the Strategy more generally, with some improvements as discussed above. Participants were keen to see the Department getting on with it however with some practical measures to improve, communicate and stage the rollout, including; moving quickly on storage curve development, benchmarks and gauge boards installation during this unprecedented drought and targeting the most active FPH storages for first rollout of electronic measurement.	The timing of various water reform initiatives underway is making it difficult for individuals to evaluate their obligations and many see the implementation phase as being rushed and ill-prepared. There is a need to clearly outline the process of implementation and to provide enough time for outstanding issues to be resolved.	The timing of various water reform initiatives underway is making it difficult for individuals to evaluate their obligations and many see the implementation phase as being rushed and ill-prepared. There is a need to clearly outline the process of implementation and to provide enough time for outstanding issues to be resolved.	Nil.
	Conclusion: In general, the implementation pathway was seen by participants as unclear and somewhat of a burden in the current circumstances. Ideas to alleviate this included: • Department to clearly outline the process of implementation and provide enough time for outstanding issues to be resolved. • Department to move quickly on finalising storage curve development, installation of benchmarks and gauge boards in all FPH storages during this unique time where most storages are dry. • Identify a prioritised implementation plan where the most active FPH storages are targeted for first rollout of electronic measurement after gauge boards have been installed.			
Timeframe	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant. The issues of drought, immature equipment testing, scale of works and ability for local providers to be involved add to this uncertainty. A rushed implementation with immature equipment will result in a costly white elephant and will be an embarrassment for the Department and the industry.	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant. Participants felt that the absence of communication regarding implementation is adding to their sense of uncertainty. There was strong feedback about the interim use of gauge boards that become a backup for future electronic measurement.	Participants were keen to see that Departmental delays did not transpire to reduced timeframes to complete their obligations. Participants felt that the absence of communication regarding implementation is adding to their sense of uncertainty. There was strong feedback about the interim use of gauge boards that become a backup for future electronic measurement. A grace period should be considered whereby compliance penalties are reduced or waived to allow for landholders to adjust to the new requirements.	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant.

	Participants are also unconvinced that the Department will be able to meet the timeframes set out for issuance of FPH licences, which underpin the requirement for measurement.			
	Conclusion: While the overall regulatory timeframes were understood the timeframes for key steps in implementing were not known. There was a low level of confidence that the Department could meet the timeframes while also mitigating the impacts of this on landowners (i.e. landowners would have less time to become compliant if Department ran late on its activities). There were some clear messages provided that landowners wanted the Department to: • Consider an extension to the current implementation timeframe to allow 12-months for landholder obligations after the Strategy, licence issuance, release of equipment specifications, etc. are completed. • Clearly communicate an achievable timeframe for rollout. • Consider a grace period of five years whereby compliance penalties are reduced or waived to allow for landholders to adjust to the new requirements. • Initiate a program of gauge board installation in all FPH storages as an interim measure ahead of electronic measurement.			
Equipment specification	The proposed equipment, whilst not new, is not widely employed in the proposed setting of on-farm irrigation storages. The optimisation of the equipment specifications can only occur through collaboration with the industry who have experience in this application.	The minimum requirements for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.	The minimum requirements for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.	The minimum requirements for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.
	Conclusion: Landholders with existing storage depth measurement devices raised concern about the ability of the Department to develop a robust and reliable measurement specification, with a risk that existing installed equipment may be non-compliant. Commentary suggested that this concern may be addressed if the Department can: • Work closely with the local industry and existing suppliers of depth measurement on-farm in order to refine specifications. • Finalise specifications and release to industry for review and feedback.			
Market capacity	Independent validation, by a Duly Qualified Person, of works done by others is an effective way to use the limited market capacity available. This will be required anyway, as existing measurement works are independently validated for grandfathering.	Lack of current market capacity is a threat to the implementation timeframe and options to make best use of the available capacity should be explored (i.e. independent certification of works done by others). The use of NRAR staff to install is tongue-in-cheek perception that they are not busy given the drought.	Engagement with local industry is critical to ensuring market capacity is available for implementation and on-going maintenance. Independent validation, by a Duly Qualified Person, of works done by others may be an effective way to use the limited market capacity available.	Nil.
	Conclusion: Participants had concerns around the capacity of local service providers to respond to the timeframes. Ideas on how these could be addressed include: • Department consider an extension to the current implementation timeframe (suggestions from some are in the order of 12 months). • Department could develop an option to allow independent Duly Qualified Person validation of works (completed by others) in the installation specifications. • Fast track the finalisation of equipment specifications and release to industry for review and feedback.			
Departmental assistance	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate and will encourage uptake for frequently used storages. Rebates for grandfathered equipment are appropriate and does not penalise early adopters of this type of measurement.	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate, perhaps inclusive of an early bird discount, and will encourage uptake for frequently used storages. Drought assistance of 0% loans or payment plans are also appropriate. Group purchasing, by the Department or industry bodies, is an effective way to secure large quantities of equipment at lower unit rates.	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate, perhaps inclusive of an early bird discount, and will encourage uptake for frequently used storages. Drought assistance of 0% loans or payment plans are also appropriate. Group purchasing, by the Department or industry bodies, is an effective way to secure large quantities of equipment at lower unit rates.	An interim approach to measurement, using gauge boards, is an effective method of progressive implementation and to introduce landholders to storage measurement.
	Conclusion: Participants suggested the following assistance options for consideration by the Department: • Apply a flat rate rebate (say 25-50% of all costs) upon completion with first-in-first-served approach until funds are exhausted.			

	• Access drought assistance funding for 0% loans or payment plans. • Consider best approach for group purchasing to secure sufficient quantity of equipment at lower unit rates. • Initiate a funded program of gauge board installation in all FPH storages as an interim measure ahead of electronic measurement.			
Data availability	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
	Conclusion: Participants had no clear understanding of the process of viewing or reviewing storage curves. Some ideas to deal with this situation include: • Develop and release a communication piece on the process of defining, providing and reviewing storage curves • Create a review, appeal and update process for landholders to finalise determination of storage curve.			
Other issues				
FPH Works Infrastructure Plans (WIP)	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is confusion around the issue of works constructed post-2008 and how these are addressed in the modelling. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued.
	Conclusion: Participants expressed that the process for developing and reviewing WIP's is not well understood and some simple steps could be taken to rectify this: • Department could communicate the process of WIPs development to landholders and accelerate its completion. There was a desire for this process to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. • Allow flexibility in the WIP for separation and isolation of individual farming units.			
Levee construction to isolate rainfall runoff from irrigated areas	The Strategy does not require landholders to build levees in order to better separate developed area rainfall runoff from FPH take. There is confusion that can be clarified with industry guidelines.	Nil.	Nil.	Nil.
	Conclusion: Participants felt that a clear set of guidelines would provide clarity for landowners around how and when to nominate the start (and define the end) of an FPH event. These guidelines should incorporate guidance or examples for properties where there is no physical separation of on-farm rainfall runoff, irrigation tailwater and FPH water.			
Entitlement determination	Nil.	Nil.	There is significant concern surrounding the accuracy of entitlement volume determination given it is not yet complete. This process needs to be accelerated and brought to completion as a necessary pre-requisite to the application of the Strategy. Further communication and landholder engagement of the process of licence entitlement determination and accelerated completion is required. This communication is to include how	There is significant concern surrounding the accuracy of entitlement volume determination given it is not yet complete. This process needs to be accelerated and brought to completion as a necessary pre-requisite to the application of the Strategy. Trading of FPH licences is intended to be made available in time however this complexity is not being addressed in the initial rollout of the Strategy.

			passive take into floodplain billabongs have been addressed in the model.	
	Conclusion: Landholders are concerned about the determination and accuracy of FPH entitlements. Landholders generally concluded that their critique of the measurement requirements depended on the accuracy/sufficiency of their FPH entitlement as a necessary pre-requisite. Participants felt that the Department could alleviate some of this concern with better communication to landholders of the progress toward final issue of entitlement to landholders and by accelerating its completion.			
FPH taken into private irrigation water supply schemes	Nil.	Nil.	Nil.	The take of FPH water into water supply schemes is not specifically addressed in the Strategy. Clarity is required on this for scheme operators and members to be able to respond.
	Conclusion: Participants suggested that the draft Strategy needs to be amended to clarify the measurement requirements for water supply schemes in order to provide clarity for operators and members on their obligations.			
General comments	Nil.	Nil.	The Strategy applies state-wide however is being initially rolled out in the five northern valleys where FPH take is most prevalent. There is obviously frustration with the process that has taken many years and landholders are keen to complete the process to gain certainty and security of their FPH water resource. The use of the term “Floodplain Harvesting” is well established and a change away from this is likely to be difficult, will introduce further confusion to stakeholders and potentially raise suspicion from outside interests.	There is perceived disparity between progress toward WIPs and entitlement and this can be rectified with clearer communication of program progress at the valley-scale and acceleration of completion.
	Conclusion: Landholders are concerned about the insecurity of not having a formal FPH entitlement, why it has taken so long and why some valleys are further progressed than others. Participants suggested that the Department could alleviate some of this concern with better communication to landholders of the progress toward final issue of entitlement to landholders and by accelerating its completion.			
Collaboration with Qld	Nil.	Collaboration with Queensland on the approach to measurement is a key element to ensure consistency across state borders and is already well established.	Nil.	Nil.
Transparency	Nil.	Attendees were advised that a copy of this report would be made available prior to finalisation.	Nil.	Nil.

Table 3: Participants' evaluation of Strategy aspects

Objectives	Metric	Industry representatives Moree	FPH landholders Moree	FPH landholders Walgett	FPH landholders Dubbo
Measurement methods	Practical	• Strategy is practical, however, timeframes are too short and the device and telemetry approach needs fine tuning • Simplification of the accounting is a good outcome • The concept of measurement at the storage is easily communicated.	• An option to use point of take measurement would add a practical element to the Strategy • There are reservations about how practical the Strategy is until some of the anomalies are clarified / resolved	• Strategy is more practical than previous versions and appears simple enough if our feedback is adopted in revision of the draft Strategy and various qualifiers can be resolved.	• Not seen as practical as there is no ability to utilise alternative measurement points (currently non-negotiable), such as measurement at the point of take. Strategy would be more practical if this option was provided. Draft Strategy is more workable than previous versions.
	Cost-effective	• The Strategy is cost-effective if money is able to be spent on robust equipment that is proven in the field • Use the least cost to achieve the outcome first (gauge boards as interim measure).	• It is difficult to understand whether Strategy is cost effective or not as there is no license / entitlement volume to compare to. It is possible that entitlement may be so low that property is not viable to operate. • Cost of telemetry – if the ongoing costs are incurred during events then yes, otherwise there is a lot of monitoring data being collected between floodplain harvesting events that is costing money for no gain	• Not convinced. Cost effectiveness improved if use of existing equipment is allowed (grandfathering of out of spec equipment e.g. GoannaAg). Not cost effective for small areas/small volume FPH. Perhaps these small storages could use a log-book type approach (perhaps with a maximum trigger volume?). The approach needs to be the same for everyone after that.	• Cannot determine if the Strategy is cost-effective until licenced entitlement is known. The FPH licence may be small, threatening farm viability, and therefore measurement cost is a significant concern. However, the cost of metering/cost of water itself is insignificant if the licence reflects historical use.
	Safe implementation	• No concerns, endorse this as a principle.	• Not applicable to group	• Allow independent certification of works done by non-duly qualified persons – allows for work to be done by a wider group of people but maintains quality via verification.	• No concerns.
Data quality	Integrity of data	• The Strategy achieves this objective, however, there are questions over the accuracy of the storage bathymetry used to generate the curve.	• Having redundancy in the form of backup gauge boards was perceived as a good addition to Strategy to ensure integrity of (backup for) electronic systems	• Not yet convinced that system will provide privacy for data acquired, particularly once accessed and held within DAS / NRAR.	• Data security is a significant issue. Data should not be retained after a certain period, say five years to reflect the multi-year accounting. • NRAR attitude – metering is required but no verification or ability to challenge their determination.
	Informs farming decisions	• Unsure given the unknown data access limitations from the DAS.	• Driver is for instantaneous data – not necessarily confident this is being delivered • Need real time access in order to inform farm decisions. Most farms already doing some sort of water budget • An on-site means of viewing level readings and gauge status would signal normal operation to landowners	• Data loggers and telemetry would be good to have for on-farm but not convinced they need to provide data to / from the Data Acquisition Service – telemetry and data collection reaching too far.	• Yes, but only if landholder receives data in real time on a separate feed to NRAR.
	Landholder calculations	• Unsure given ambiguity in the definition of an event and FPH take (timing of nomination) • Need clarity on calculation equation and WIP inclusions.	• No further concerns additional to the accounting issues raised above.	• Similar to above.	• As above.
	Program evaluation	• The Strategy will likely achieve this however change the language that all FPH is measured to an accuracy of 10%.	• Recommendation to use language defining a 10% error band rather than 90% of FPH take is measured.	• 90% figure is ok. Reserving opinion on this until the final FPH licence volumes are known.	• 90% is a good balance between complexity, cost of measurement and accuracy.
Data quantity	Identification of triggers for compliance	• Data collection is good but it is meaningless without context and evidence of what was going on on-farm.	• Desire is to not please everyone, rather ensure agreed standards and legal requirements are met	• The Strategy needs to withstand public scrutiny, but it shouldn't be the main driver • Seen as a good thing to have a structure in place but not universally agreed that it is required (with telemetry) to ensure compliance • Hard to accept a gold-plated system of measurement just to satisfy public perception.	• The Strategy will help with public scrutiny, but its useless without the FPH licence.

5. Analysis and synthesis

The conclusions recorded above, based on the views articulated by workshop participants, have been analysed to provide potential pathways to resolving some of the key issues raised. It is acknowledged that the Department will have its own protocols and approach for resolving the draft Strategy and so the following analysis is provided as an external perspective that may or may not align with the Department's thinking specific to the Strategy document. It is therefore not a recommendation but a series of suggestions or pathways. It is important to note that the Strategy provides the high-level compliance rules for FPH measurement. While the intent is that the guidance on how to apply these rules is to sit outside of the Strategy document much of the feedback comes from a desire to have a more holistic resolution of all elements of the Healthy Floodplain project.

The following Sections have been structured according to the identified pathways in the previous table and includes analysis as to how the key issues associated with the Strategy and its implementation could be resolved.

5.1 General program communications

A significant risk to the rollout of Floodplain Harvesting policy more generally is the uncertainty amongst participants arising from a view that published timeframes are unrealistic. There is also frustration that multiple elements of water licensing and measurement are being rolled out concurrently with an apparent lack of co-ordination between Department roles including:

- NRAR developing storage curves and Works Implementation Plans (WIPs) – it is not clear to many participants what the process is to access and review the information, particularly with the separation of properties into independent management units, modelling of floodplain billabongs and how works post-2008 are considered.
- Non-urban water metering program – experience with metering was conveyed in a mostly negative way and there is a low level of confidence that either the technical requirements or policy position has been managed well in the past or can be managed better for implementation of FPH measurement systems.
- Modelling of licence entitlement volumes being done by others – a lack of communication around the process for accessing proposed license volumes and then being able to review the proposed instrument is an obvious piece of information that ties together the entire policy rollout.

The Floodplain Harvesting Action Plan (September 2019) is available (www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project) and provides guidance on the high-level approach to implementation although the nature of feedback from the focus groups suggests that this document either has not been viewed by participants or maybe does not provide the detailed understanding that participants are seeking. As a general observation, irrigators provided feedback suggesting that they do not differentiate between the various groups within the Department with responsibility for the Healthy Floodplain Project and so the perceived program issues inevitably are linked to the delivery of the Strategy. Although the Department may already have processes in place to manage these co-ordination issues, the feedback from focus groups identifies potential risks to the successful roll-out of the Strategy. If participants are not able to close the current gaps in their understanding of the broader policy roll-out, then they were reluctant to endorse the Strategy as meeting its objectives.

A response to this aspect will likely require an improved focus on co-ordination between each of the groups within the Department as well as effective communication methods considerate of the impact of linkages experienced by the participants.

Suggested action 1 General program communication

A review of communication should be undertaken to identify how more specific information can be provided to FPH communities around the 'within milestone' activities and targets and when to expect interactions with various Government agencies (or subsets of Departments) including:

- Identify how and when the valley-specific process of WIPs fits into the timeframes for issuing of licence entitlement determination.
- Confirming that flexibility can be provided in the WIP for separation and isolation of individual farming units for separate measurement.
- Providing advice on a process for finalising storage curve development and issuing to FPH licence holders.
- Map out a review, appeal and update process for landholders to challenge determination of WIPs and storage curves.
- Develop information on the metering / measurement and telemetry systems being considered.

Concerns were also recorded that the feedback being provided in the focus groups will not be taken into consideration. This was partially addressed by committing to making this report available to participants. There is also a sense that the landowners have been involved in a complex area of water reform and there is a general overload of information from different government agencies. Our review of material available on the website show that there is a substantial amount of information available, however, it is likely that a simplification of the key documents (e.g. process mapping) would provide a simpler pathway for individuals to understand where they are at in the overall reform process.

Suggested action 2 Communication of agency linkages

The Department should consider providing a simplified process map that shows how a typical FPH participant should expect to work through the regulatory process to become compliant with the Strategy.

5.2 Point of measurement

The Strategy states that the measurement point at the on-farm storage is non-negotiable. There were circumstances identified through focus groups where this could be relaxed (or exempted) with the inclusion of point of take measurement to ensure much greater acceptance including:

- Multiple cells within on-farm storages where costs of implementing storage devices rise considerably
- Where FPH point(s) of take are few, through a fixed structure and relatively easy to measure
- Where a landowner has a strong preference for point of take measurement (although it may cost more) to avoid doubt with NRAR compliance around nomination of an FPH event
- Where there is confusion about what is long-term storage versus surge areas on the property.

Some of the resistance to storage measurement is due to the requirement for ongoing data collection of storage levels, even though there are extended periods of no floodplain harvesting activity (sometimes for many years). Repeated justification of 'water in storage' is concerning to many irrigators as it creates a permanent and ongoing requirement for maintenance of equipment without any return on investment. For point of take systems, measurement effectively lies dormant until an event occurs; at which time all flows measured are considered FPH take.

The primary implication of point of take measurement is that any developed area rainfall runoff during a nominated FPH event would not be counted as FPH. However, with point of take measurement, the water losses downstream of

the meter, inclusive of transmission losses and losses in the storage, are sustained by the landholder. Measurement at the storage does not attribute these losses to the landholder's FPH allocation.

The suitability of point of take measurement for a particular property is subject to assessment by a Duly Qualified Person to determine if the site will meet minimum certification requirements both for initial installation and on-going operation. This may mean that whilst point of take measurement is desired by a landholder, it may not be permitted due to lack of confidence in measurement accuracy. Potential issues include:

- Infrastructure not suited to closed conduit measurement (i.e. insufficient straight length, out of round, very large diameter, etc.)
- Gravity pipes / culverts not running full
- Potential for siltation affecting accuracy of measurement
- Resilience of field equipment to flood inundation
- Poor site access during an FPH event (for emergency maintenance).

These issues can be addressed through changes to infrastructure (i.e. lengthening the conduit, upstream silt traps, control boxes above flood level, etc.) and appropriate meter selection for the application. Point of take measurement, like any other form of measurement, requires regular maintenance to ensure that meters are operating as per the design intent. However, in some cases these considerations may render the option of point of take measurement unfeasible in comparison to storage measurement.

Across all five valleys, it is understood that relatively few properties are likely, or able to cost-effectively, adopt point of take measurement and therefore the impact overall is likely to be negligible. However, property configurations and the long-term nature of FPH events in the lower Macquarie Valley suggests that point of take measurement may be more appropriate and this was strongly argued by the Dubbo focus group participants. This position is commendable as participants know that in long-lasting FPH events (extended overbank / riverine flooding) there is significant opportunity under the Strategy for them to take water from the floodplain direct to irrigation. With measurement being at the storage, this would mean that there is a risk of significant volumes of unaccounted FPH water being compliantly taken.

If flexibility to allow point of take measurement is allowed, it may create circumstances where properties elsewhere that also have a high risk of taking floodplain water direct to irrigation may also decide, or be directed to, install point of take measurement. There did not appear to be any focus group participants that were opposed to this situation and so it is proposed as a reasonable measure.

Suggested action 3 Point of measurement flexibility

The Strategy should include provisions that allow nomination of a certified point of take measurement through a fixed structure if it can be demonstrated that floodplain harvesting can be accurately accounted for.

Case studies examined in focus groups with temporary storage, or field storage raised confusion amongst participants due to the lack of definition, however, the situation was viewed as being rare and not accounting for a large volume of FPH take. The general view agreed by participants is that any structure that stores (overland flow or flood) water should be measured, with some degree of clarification to be made on the difference between a surge area and a storage.

Suggested action 4 Point of measurement application to temporary storages

A body of work should be completed around the definition of a storage and addresses as a minimum:

- A process for clearly identifying all storage areas on-farm on the WIP, whether long-term or otherwise, for measurement.
- Definitions to clarify how different storage types are treated particularly to communicate the difference between a surge area / temporary storage and an FPH storage.
- Development of a pathway to allow a negotiated measurement solution for properties that take FPH in a unique way.

5.3 Cost of measurement

The cost of measurement was raised as a significant issue, however, the drivers of concern are the cumulative effects of; the current unprecedented drought, multiple on-farm storages, the accelerated instrumentation of all regulated surface water and groundwater pumps, device reliability and the on-going costs of telemetry. These issues are more about affordability than cost-effectiveness and so they are dealt with in subsequent suggested actions associated with implementation and telemetry in the Sections below.

The underlying cost of the point of measurement itself is relatively small in consideration of the value of water taken, even for an (example) small FPH licence:

- $5,000 fully installed capital cost per storage meter (approximately)
- Say 500 ML total FPH licence across three storages
- Total capital cost $15,000 at $30/ML.

If the storage measurement device has a design life of 15 years, then the relative cost is $2/ML/p.a. for a licence that may produce a total annual revenue of hundreds of times this amount per ML.

As the capital cost is per storage, the relative cost for larger FPH licences with larger/fewer storages may well be less.

5.4 Accounting

The simplification of the accounting process was welcomed by participants. The definition of developed area rainfall runoff as non-FPH was also welcomed as a common-sense approach, however, did create some confusion about how to define the difference between developed area rainfall runoff and an FPH event; in essence, how to nominate the start and end dates of an FPH event. The ability (or lack thereof) to nominate an end date was of concern to some participants.

Best practice principles – National water accounting standards

It was evident that participants understood that basic accounting principles are typically rigid in the way they are applied by regulators. The impact of this is that participants were unsure how the simplifications in accounting in this case would be applied by NRAR without further definition or agreement, specific to the individual property, around what is an accepted point of transition between the two water sources.

The Strategy is broadly aligned to Australian Water Accounting Standards (AWAS) which provide guidance on best practice principles for general purpose water reports. AWAS 1 states that a general-purpose water accounting report comprises the following components:

(a) Statement of water assets and water liabilities

(b) Statement of changes in water assets and water liabilities

(c) Statement of water flows

(d) Note disclosures

(e) Accountability statement

(f) Contextual statement.

Although it is not suggested that the Strategy is intended to result in the production of a general purposes water report the adoption of best practice principles support the Strategy objectives of data integrity and demonstrating compliance. The Strategy broadly meets the first three items above, however, the qualification of accounts (items (d), (e) and (f)) is at the core of why landowner concerns arise and where development of best practice guidelines may provide a logic pathway to resolve the concerns.

AWAS 1 – Item 147 to 149 provide guidance on quantification approaches:

147 - Information shall be disclosed in the notes to assist users of a general-purpose water accounting report to understand the approaches used to quantify items presented in the water accounting statements.

148 - Different quantification approaches may be used for the various items presented in the water accounting statements. Those quantification approaches may give rise to materially different levels of quantification accuracy. Therefore, information is provided to assist users in understanding how an item's volume has been determined

149 - To give effect to the principle, the following information is disclosed in the notes:

a) the quantification approaches used for the items;
b) a statement as to whether the quantification approaches are in accordance with relevant quantification standards or established practices and the identification of those standards and practices;
c) details of any quality assurance processes underpinning the quantification approaches;
d) the levels of accuracy or precision achieved by the quantification approaches; and
e) the sensitivities of the quantifications to key assumptions used in the quantification approaches.

In practice the detailed methods for accounting (i.e. accounting of changes in water assets and liabilities post measurement of event) were not tested in focus groups in any detail as only the basic principles of how the system will operate were conveyed to participants. The in-depth discussion of issues around the finer points of accounting that were observed at all focus groups is a good indicator that the further definition and development is required before release of the Strategy. However, a need for better guidance was articulated by many participants.

Suggested action 5 Guidance on accounting qualifications

The Department should consider liaising with relevant agencies and industry bodies in order to:

- Develop guidelines for FPH (e.g. Quantification Approaches to FPH) that describe the event nomination process and accounting time / volume tolerances; and
- Develop a suite of extension activities to educate all FPH licence holders on their accounting and reporting obligations.

Pathway to resolve FPH start time nomination

The definition of developed area runoff as non-FPH water was referred to but not tabled in the focus groups and some of the questions around the finer details of the policy position were not able to be answered clearly. Separation of developed area rainfall runoff from FPH take was nominated as a potential compliance issue as landholders will have to nominate a specific point in time when non-FPH developed area runoff ceases and FPH take starts. This may be difficult for some landholders where this separation is not distinct.

Focus group responses mostly requested a consistent set of guidelines that address two core accounting issues; the developed area rainfall runoff and evidence requirements to justify the start and end date for a nominated FPH event. Concerns were aired at most focus groups around how NRAR will assess compliance when much of the onus in the

Strategy is placed on the landowner to make a judgement as to when transition from developed area runoff (non-FPH) to FPH take occurs. The fear is that the assessment will be open to judgement and that the resolution of any discrepancies may be difficult to resolve. This would lead to further time and cost pressures.

Industry representatives indicated that there is an overwhelming need, and they are willing to assist the Department in this process, to ensure that landholders understand their compliance requirements.

Suggested action 6 Accounting issues pathway

The Department should consider how it can:

- Provide further information to clarify the definition of developed area runoff regarding FPH event nomination.
- Provide guidance on what will be considered acceptable practice to substantiate accounting treatment for developed area runoff (e.g. on-farm rainfall records).
- Provide guidance through worked examples of acceptable evidentiary requirements for FPH event nomination.
- Provide suitable references in the Strategy to direct landowners to NRAR for questions and concerns relating to compliance.

In addition to the general requirements for guidelines, some of the specific issues that will need to be addressed in development of guidelines or quantification approaches are unpacked below.

Multi-year accounting and passive exceedance of entitlement volume

The Strategy is not explicit on how landowners with FPH entitlements are to accrue harvested volumes. An understanding around accounting for take over a rolling 5-year period was observed in comments from some participants but there was no definitive position on this given entitlement volumes have not yet been issued. It is our understanding that the Water Sharing Plan update will provide the accounting rules. The lack of landowner specific information feeding out of the modelling process meant that the discussion of multi-year accounting could not be taken too much further with participants.

Case studies were discussed where the definition and treatment of billabong-type storages was workshopped in detail. The key issue with these was not so much the measurement of the storage but rather significant concern about the uncontrolled take of FPH into these storages when annual FPH allocations are exhausted and where there is limited or no ability to return this water to the floodplain. Discussions around this potential situation led to further confusion about the application of multi-year accounting for FPH or ability to go into account debit.

Suggested action 7 Accounting approach for license volume limits

Subsequent versions of the Strategy could be made clearer on how water extracted against the license volume limits will be applied including:

- Providing links to how and where the adoption or otherwise of multi-year accounting and ability to go into account debit.
- Providing clarity on how uncontrolled FPH take into passive storages is to be addressed when licenced volume is exhausted.

Procedure for commencing an event if equipment has failed

Irrigators with experience in dealing with other NSW metering initiatives were generally agitated by the arrangements currently in place for selecting equipment. Some experiences in dealing with level sensors were also expressed with negative sentiments towards work that the Department has done around creating a preferred product listing. These concerns relate back to the fact that faulty equipment at the start of an event could result in either a compliance confrontation which could be difficult to resolve or a delay in a landowner being able to harvest an event with limited duration.

Basic reference was made to the work completed by the Department with the Manly Hydraulics Laboratory to complete a market sounding exercise. Even if details of this commercially sensitive work could have been made available it is unlikely that the information would have resolved the core issue of individuals which was about forecasting potential compliance headaches rather than just the quality of equipment.

It seems that a logical and prudent way of mitigating many of these concerns is to mandate gauge boards as a backup to automated sensor information. Whilst there are other methods of estimating FPH take (such as volume estimates from pump flow rates), gauge boards are cost-effective, useful, reliable and have relatively high degree of accuracy given they utilise the same measurement approach as the storage device (relate storage depth to volume).

Suggested action 8 Accounting approach during equipment failure

A backup measurement device such as gauge boards should be incorporated into the Strategy as acceptable redundancy measurement and the Department should consider clarifying the conditions surrounding:

- The ability to take FPH if measurement equipment has failed; and
- Provide clear guidelines on the procedures to be followed if backup data collection is to be used as evidence of an event.

Basic landholder right (BLR)

The ability to account for the legal right to take a limited volume of water under Basic Landholder Rights as non-FPH in coincident on-farm works was identified as an area where further clarity is required as the Strategy does not currently allow this take as a deduction. BLR could simply be applied as a single, annual deduction from the FPH take for a property where BLR is taken through the same works as FPH.

Suggested action 9 Accounting approach for BLR

It would be prudent for the Department to clarify the status of Basic Landholder Rights water as it pertains to accounting for FPH take.

Complex water supply / distribution arrangements

An example was flagged for discussion whereby the water historically extracted was distributed to multiple properties under a common licensing arrangement. This highlighted that accounting of FPH take into irrigation water supply schemes has not been incorporated into the Strategy and requires clarification. The implication is that the point of measurement for the FPH works approval is unclear and will need to be resolved.

Suggested action 10 Accounting responsibilities for water supply schemes

It would be prudent for the Department to clarify the obligations for water supply scheme operators regarding FPH take and how the measurement Strategy is applied.

Treatment of overhead irrigation

There was some confusion raised about the application of the definition of non-FPH developed area rainfall runoff from areas where overhead and sub-surface irrigation methods are used. All runoff from developed irrigation areas with a tailwater return system is considered to be non-FPH and it is assumed that areas of overhead or sub-surface irrigation are also contained by a tailwater return drain system for capture of contaminated agricultural runoff.

Suggested action 11 Accounting treatment of rainfall runoff from overhead irrigation developments
Further clarity on the treatment of overhead or sub-surface irrigation developments should be provided regarding non-FPH developed area rainfall runoff.

5.5 Data transfers and interfaces

The proposed telemetry arrangements were identified by participants as problematic for the following reasons:

- Data security and privacy provisions were not trusted
- On-ground data loggers were understood to be the primary source of evidence – there was a view that data that has been transmitted would be used by NRAR for compliance activities, yet the use of transmitted data was believed to not be legally defensible. This led to individuals questioning whether the return of data from the DAS would be useful to them managing their accounts (a concern about timeliness)
- It was understood that transmitting data during an event may be useful for compliance but the notion that continuous data collection for every storage was an exercise in generating 'big-data' rather than pure compliance of FPH
- Landholder's experience with telemetry in surface water metering was negative and did not extend to any confidence in the roll-out of FPH telemetry being a better experience
- Cost of continual storage measurement particularly if a storage is empty, for infrequently used storages or the cumulative cost of multiple storages
- Reliability of telemetry equipment in the field is prone to failure
- Mobile coverage is poor across large areas of the five valleys.

Data access and security

The use of telemetry provides for cost-effective real-time data collection that is useful for both landholder and NRAR. Landholders have the view that they have ownership of the data being collected and should be allowed to access it in real-time in order to undertake accounting, respond to compliance requests and to improve on-farm management of their water resources. However, this depends on the technical issues being satisfactorily resolved and communicated to landholders (i.e. mobile network coverage).

Landholders' held valid concerns regarding the cumulative monthly cost of multiple storage device telemetry subscriptions. This can be mitigated technologically with individual storage measurement devices and other telemetered measurement points on property being able to relay back to a single point of connection to the Data Acquisition Service.

Suggested action 12 Arrangements for data collection, security and privacy
The Department should consider how it can:

- Allow landholders to realise the benefits of telemetry and data collection through access to their data in real-time, concurrent with data sent to the DAS (i.e. provide a split signal from data logger).
- Better communicate adopted data collection, security and management measures to landholders with reference to the collection of data outside of nominated FPH events.
- Communicate resolutions to landholders regarding technical issues (such as mobile network coverage), including the option for data relay to a single connection point.

Collective asset management approach

The approach taken in the Strategy, indeed for the entire NSW non-urban water metering framework, that the landholder must directly pay for continual telemetered access contrasts with the approach taken within irrigation districts both in NSW and interstate. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user.

The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management body for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages:

- Centralised and formal asset management approach with consistent utilisation of uniform equipment
- Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size
- Continuous IP and skills development in use and maintenance of technology in a relatively new setting
- Optimisation of costs through economy of scale
- Maintenance of central inventory for equipment repair and replacement.

This approach, with metering and telemetry managed by a central body, would address most of the concerns raised regarding cost, reliability and responsibility. The body would efficiently maintain the skills and equipment required for maintenance and replacement.

Suggested action 13 Collective asset management

It would be prudent for the Department to consider if, and/or how, it could provide assistance to industry in establishing a centralised body [or private sector arrangement] to collectively manage FPH metering assets for willing participants.

5.6 Approach to implementation

The current approach to implementation generated significant discussion and feedback during focus groups. The timing of various water reform initiatives underway is making it difficult for individuals to evaluate their obligations and many see the implementation phase as being rushed and ill-prepared. An important insight that can be taken from this feedback is that there appears to a broad acceptance of measurement and the Strategy more generally. Participants were mostly keen to see the Department getting on with implementation albeit after incorporation of some of the suggested practical measures to improve and stage the rollout.

Although it was understood and acknowledged that implementation plans are being considered as the next sequential activity to be completed by the Department, the depth of feedback demonstrates that the community considers the implementation to be an integral part of the Strategy. It would appear to be important to the ultimate acceptance of the Strategy that the roll-out plan is provide in parallel with release of Strategy.

A common response regarding implementation is that most irrigators would be in favour of staging the implementation. A staging plan could be readily developed incorporating an interim step of using gauge boards to establish initial measurement. Careful implementation of electronic / automated systems would then follow when equipment specifications and market development has matured further. The feedback was overwhelming that gauge boards are cheap, useful and reliable means of assessing storage volume. Importantly they serve both an interim measure and subsequently as a backup to later installation of electronic measurement. The roll-out of gauge boards, if commenced immediately, could see a quick achievement for the policy initiative (i.e. within a few months) whilst storages are predominantly empty due to drought. This would send a clear message to basin communities that FPH take is being measured, that the Department and industry are "getting on with it", as a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.

Suggested action 14 Implementation of a staged roll out plan

Significant benefits would be realised if the Department, as soon as possible, developed and communicated a detailed staging plan to:

- Clearly outline the process of implementation, including a potential interim stage whereby back-up (redundant) measurement such as gauge boards is installed, providing enough time for outstanding issues to be resolved.
- Support a case for rapid finalisation of storage curve development, installation of benchmarks and gauge boards in all FPH storages during this unique time where most storages are dry.

As part of the staging of Strategy implementation, there was a compelling sentiment from participants for the Department to develop a prioritisation methodology. Discussion of how this might be completed was strongly focussed on where compliance will achieve the most beneficial outcome (i.e. maximise measurement of take).

Options of targeting larger storages alone were dismissed by many participants as a single priority as the combination of storage size, location and frequency of available floodplain harvesting events were thought to deliver a more holistic assessment of priority. This discussion led to a position where participants thought the Department should adopt a process of identifying the most active FPH storages and target these for first rollout of electronic measurement after gauge boards have been installed. Although it was not specifically mentioned, the best source of information on storages and fill frequencies would be from the current modelling work to derive entitlements.

Suggested action 15 Implementation of a prioritisation plan

FPH participants would take significant comfort if a prioritisation plan could be developed for Strategy implementation and within the staged roll-out that the Department give consideration to prioritisation approaches that would see the highest yield storages captured first.

The proposed storage measurement equipment, whilst not new technology, is not widely employed in the proposed setting of on-farm irrigation storages. It is not trusted as a reliable solution with telemetry added which is why many questioned the need for data to be transmitted from the data logger. In a sense, the feedback is suggesting that more time is required to allow development of minimum equipment specifications, grandfathering conditions, the adaptation of technology in this setting and resolution of various technical and telemetry issues.

The optimisation of the equipment specifications will be best served through collaboration with the industry who have experience in this application and support from the Department in optimising the outcome for irrigators. There was a view expressed that the local providers were the ones that would provide the ongoing support services and that the community did not want a situation where equipment installation was either rushed or completed by companies that would not stay beyond the installation period to support the products. One of the natural conclusions from the

feedback is that some form of centralised procurement effort may be beneficial to coordinating the roll-out of various work steps/packages.

Suggested action 16 Implementation through industry engagement

The Department should examine whether there are options available to provide a procurement framework where experience within industry groups can be leveraged to:

- Work closely with the local industry and existing suppliers of depth measurement on-farm in order to refine specifications and release to industry for review and feedback.
- Consider the merits of an extension to the repair period specified in the Strategy for electronic storage measurement failures to allow local market capacity to establish and mature.

5.7 Implementation timeframe

The draft Strategy was not specifically developed with firm implementation steps (assumed that this is coming), however, much of the anxiety around the Strategy appears to be generated from the lack of understanding amongst the community around how the Strategy will be rolled-out. The Floodplain Harvesting Action Plan (September 2019) is publicly available (www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project) and provides guidance on the high-level implementation milestones. It was clear that from focus group discussions that the deadline for having compliant monitoring by June 2021 was understood by irrigators.

A common opinion provided in each of the focus groups is that the deadline is too short because what participants understand to be a detailed program of activities to be delivered has not been addressed in any of the material from the Department. The nature of feedback from the focus groups suggest that the implementation action plan either has not have been viewed by some participants or maybe does not provide the understanding that participants are seeking. In order to test the veracity of this feedback we undertook a brief exercise to map interdependencies as far as they can be understood from publicly available information. Table 4 lists the key tasks and dependencies and shows that significant delays will become evident if irrigators delay decision making until certainty on a number of activities is achieved. Participants' conclude from the interdependencies shown in Table 4 that a large-scale procurement phase will likely need to occur in the six-month period prior to FPH licence enforcement. One of the reasons given for choosing to delay expenditure on FPH measurement is that individuals are faced with having to manage the plethora of other program requirements where the overlaps in timeframes become too challenging.

Table 4: Rapid mapping of dependencies

FPH activity	Activity required to be completed		Dependencies
Entitlements	1.1	Modelling	Ongoing
	1.2	WIPs	Documentation of irrigation property layouts – Unclear how much has been completed
	1.3	Draft License	Scheduled Q3 – Q4 2020
	1.4	Issue of licenses	Dependent on 1.3, 1.2 and 1.1 Scheduled Q2 2021
Survey	2.1	Regional benchmarking review	Underway – not clear on timeframe for completion

	2.2	Storage benchmarks	Dependent on 2.1
	2.3	Storage curves	Dependent on 1.1 and 1.2 Unclear on process to provide to participants
Hardware/software	3.1	Install redundancy measurement devices	Strategy could provide a clear position on this
	3.2	Telemetry configuration	Underway
	3.3	Specifications – develop and publish	Underway
	3.4	Duly qualified persons – training completed	Underway
Procurement	4.1	Device suppliers – lead time	Dependent on 3.3
	4.2	Landowners sourcing installers	Dependent on outcomes of 2.2, 2.3, 3.3, 3.4, 4.1 Feedback that they likely to wait until 1.2 and 1.3 are resolved
	4.3	Installation period	Dependent on 4.1 and 4.2
	4.4	Compliant storages	Start of 4.3 onwards

Suggested actions in Section 5.6 were around coordination to better define program overlaps, however, the feedback identifies gaps in understanding and perhaps a need to better engage around the specific impacts associated with rolling out the FPH program. While this request does not constrain the Department in pushing on to publish the Strategy some additional refinement of communications may broaden acceptance of FPH irrigators in the need to move forward with implementation. One of the ways that the communication of timeframes could be improved is to notify all FPH participants that the Action Plan exists and to provide a simplified map/directory showing how a typical FPH irrigator can better engage by accessing specific documents to understand the various aspects of FPH licensing and compliance process.

Suggested action 17 Timeframe communications

The Department should consider development of a measurement compliance 'road-map' that can clearly communicate the timeframes and challenges associated with Strategy rollout.

The staged approach to implementation dovetails with feedback requesting an extension to the implementation timeframe. Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The issues of drought, immature equipment testing, scale of works and ability for local providers to be involved (market capacity) add to landholder's uncertainty about their compliance obligations. A rushed implementation with immature equipment will result in a costly white elephant, will be an embarrassment for the Department and the industry and worst of all, will severely undermine landholder engagement in the ultimate measurement of FPH take. Participants are also unconvinced that the Department will be able to meet the timeframes set out for the issuance of FPH licences, which underpins the conditions / requirement for measurement.

The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant.

Suggested action 18 Timeframe extensions

If feasible within existing external agreements/commitments, the Department should:

- Consider how it can accelerate background works (specifications, WIPs, issuance of licence entitlements, etc.) to allow more time for landholders to make arrangements to meet their obligations under the Strategy.
- Consider how the provision of engagement and education activities can be delivered to provide higher levels of confidence that compliance measures can be met in the timeframes available.

In addition to options to extend timeframes, options were put forward by participants to improve roll-out timeframes by saving time on some tasks. An example of this was to make use of existing information to save time including options to:

- Accelerate the modelling
- Accelerate entitlement communication processes
- Reduce the time and cost of sourcing (limited) resources to undertake installation.

Participants outlined a practical option to utilise an independent validation process, by a Duly Qualified Person, of works done by others as an effective way to use the limited market capacity available. It was noted that this will also be required for grandfathering as existing measurement works are independently validated.

However, the Strategy legally requires a Duly Qualified Person to complete all aspects of installation, consistent with Clause 236 of the Water Management (General) Regulation 2018.

5.8 Assistance from Department

Participants felt that the best assistance the Department could provide related to collaboration with industry and landholders in addressing the issues outlined above (i.e. implementation schedule, equipment specifications, telemetry, point of take measurement, etc.) and clearly communicating these outcomes, which in turn eases the cost burden of measurement.

With regard to monetary assistance, the capacity to pay was generally identified as being more significant than cost-effectiveness. The overlap between ongoing drought and other non-urban water metering requirements were identified as examples of where FPH measurement was not just an incremental cost to each farming business.

Overwhelmingly the message received about costs is that cash flow constraints during the present drought meant that the assistance needed to be directed towards offsetting or delaying new costs.

However, subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, perhaps inclusive of an early bird discount, is appropriate and will encourage uptake for frequently used storages (as landholders will naturally be reluctant to instrument infrequently used storages first). Rebates for grandfathered equipment are also appropriate and do not penalise early adopters of this type of measurement. Drought assistance support with zero-interest loans or repayment plans will also help with the cost burden.

Suggested action 19 Assistance options

If financial assistance is available, the Department should consider how it might:

- Apply a flat rate rebate (say 25-50% of all costs) upon completion of storage instrumentation with first-in-first-served and early-bird discount until funds are exhausted.
- Assist irrigators to access drought assistance funding for zero-interest loans or payment plans.

Group purchasing, by the Department or industry bodies, was raised as an effective way to secure large quantities of equipment at lower unit rates. It is not clear how the Department would become actively involved in this type of procurement. However, there is scope for industry representative bodies to organise group purchasing which would require some level of support from the Department to supplement the skills and capabilities required to conduct such a process.

Suggested action 20 Assistance via group purchasing

The Department could provide valuable assistance by providing advice to FPH landholders on what it recommends as the best approach for group purchasing to secure sufficient quantities of equipment at lower unit rates.

6. Summary of suggested actions

A summary of the actions suggested in Section 5 is given below. It should be recognised that many of these are broader than simply updating the Strategy and so may need to be considered more holistically by the Department in the delivery of the floodplain harvesting program. Accordingly, each suggestion has been categorised as follows:

- General – issues that require whole of Department consideration
- Strategy – issues relating specifically to gaps or improvement opportunities in the draft Strategy
- Implementation – broader elements of the Strategy that can be addressed for an improved roll-out process.

No. and title		Suggested action	Category
1	Communication of program	A review of communication should be undertaken to identify how more specific information can be provided to FPH communities around the 'within milestone' activities and targets and when to expect interactions with various Government agencies (or subsets of Departments) including: • Identify how and when the valley-specific process of WIPs fits into the timeframes for issuing of licence entitlement determination. • Confirming that flexibility can be provided in the WIP for separation and isolation of individual farming units for separate measurement. • Providing advice on a process for finalising storage curve development and issuing to FPH licence holders. • Map out a review, appeal and update process for landholders to challenge determination of WIPs and storage curves. • Develop information on the metering / measurement and telemetry systems being considered	G
2	Communication of agency linkages	The Department should consider providing a simplified process map that shows how a typical FPH participant should expect to work through the regulatory process to become compliant with the Strategy	G, I
3	Point of measurement flexibility	The Strategy should include provisions that allow nomination of a certified point of take measurement through a fixed structure if it can be demonstrated that floodplain harvesting can be accurately accounted for.	S
4	Point of measurement application to temporary storages	A body of work should be completed around the definition of a storage and addresses as a minimum: • A process for clearly identifying all storage areas on-farm on the WIP, whether long-term or otherwise, for measurement. • Definitions to clarify how different storage types are treated particularly to communicate the difference between a surge area/ temporary storage and an FPH storage. • Development of a pathway to allow a negotiated measurement solution for properties that take FPH in a unique way.	S
5	Guidance on accounting qualifications	The Department should consider liaising with relevant agencies and industry bodies in order to: • Develop guidelines for FPH (e.g. Quantification Approaches to FPH) that describe the event nomination process and accounting time / volume tolerances; and	S, I

No. and title		Suggested action	Category
		• Develop a suite of extension activities to educate all FPH licence holders on their accounting and reporting obligations	
6	Accounting issues pathway	The Department should consider how it can: • Provide further information to clarify the definition of developed area runoff regarding FPH event nomination. • Provide guidance on what will be considered acceptable practice to substantiate accounting treatment for developed area runoff (e.g. on-farm rainfall records). • Provide guidance through worked examples of acceptable evidentiary requirements for FPH event nomination. • Provide suitable references in the Strategy to direct landowners to NRAR for questions and concerns relating to compliance.	S, I
7	Accounting approach for license volume limits	Subsequent versions of the Strategy could be made clearer on how water extracted against the license volume limits will be applied including: • Providing links to how and where the adoption or otherwise of multi-year accounting and ability to go into account debit. • Providing clarity on how uncontrolled FPH take into passive storages is to be addressed when licenced volume is exhausted.	S
8	Accounting approach during equipment failure	A backup measurement device such as gauge boards should be incorporated into the Strategy as an acceptable backup and the Department should consider clarifying the conditions surrounding: • The ability to take FPH if measurement equipment has failed; and • Provide clear guidelines on the procedures to be followed if backup data collection is to be used as evidence of an event	S
9	Accounting approach for BLR	It would be prudent for the Department to clarify the status of Basic Landholder Rights water as it pertains to accounting for FPH take.	S, G
10	Accounting responsibilities for water supply schemes	It would be prudent for the Department to clarify the obligations for water supply scheme operators regarding FPH take and how the measurement Strategy is applied.	S, I, G
11	Accounting treatment of rainfall runoff (from overhead irrigation)	Further clarity on the treatment of overhead or sub-surface irrigation developments should be provided regarding non-FPH developed area rainfall runoff.	S, G
12	Arrangements for data collection, security and privacy	The Department should consider how it can: • Allow landholders to realise the benefits of telemetry and data collection through access to their data in real-time, concurrent with data sent to the DAS (i.e. provide a split signal from data logger). • Better communicate adopted data collection, security and management measures to landholders with reference to the collection of data outside of nominated FPH events.	S

No. and title		Suggested action	Category
		• Communicate resolutions to landholders regarding technical issues (such as mobile network coverage), including the option for data relay to a single connection point.	
13	Collective asset management	It would be prudent for the Department to consider if, and/or how, it could provide assistance to industry in establishing a centralised body [or private sector arrangement] to collectively manage FPH metering assets for willing participants.	S
14	Implementation of a staged roll-out plan	Significant benefits would be realised if the Department, as soon as possible, developed and communicated a detailed staging plan to: • Clearly outline the process of implementation, including a potential interim stage whereby back-up (redundant) measurement such as gauge boards is installed, providing enough time for outstanding issues to be resolved. • Support a case for rapid finalisation of storage curve development, installation of benchmarks and gauge boards in all FPH storages during this unique time where most storages are dry	I
15	Implementation of a prioritisation plan	FPH participants would take significant comfort if a prioritisation plan could be developed for Strategy implementation and within the staged roll-out that the Department give consideration to prioritisation approaches that would see the highest yield storages captured first.	S, I
16	Implementation through industry engagement	The Department should examine whether there are options available to provide a procurement framework where experience within industry groups can be leveraged to: • Work closely with the local industry and existing suppliers of depth measurement on-farm in order to refine specifications and release to industry for review and feedback. • Consider the merits of an extension to the repair period specified in the Strategy for electronic storage measurement failures to allow local market capacity to establish and mature.	I
17	Timeframe communication	The Department should consider development of a measurement compliance 'road-map' that can clearly communicate the timeframes and challenges associated with Strategy rollout.	I
18	Timeframes extension	If feasible within existing external agreements/commitments, the Department should: • Consider how it can accelerate background works (specifications, WIPs, issuance of licence entitlements, etc.) to allow more time for landholders to make arrangements to meet their obligations under the Strategy. • Consider how the provision of engagement and education activities can be delivered to provide higher levels of confidence that compliance measures can be met in the timeframes available.	S, I
19	Assistance options	If financial assistance is available, the Department should consider how it might: • Apply a flat rate rebate (say 25-50% of all costs) upon completion of storage instrumentation with first-in-first-served and early-bird discount until funds are exhausted.	S. I

No. and title		Suggested action	Category
		• Assist irrigators to access drought assistance funding for zero-interest loans or payment plans	
20	Assistance via group purchasing	The Department could provide valuable assistance by providing advice to FPH landholders on what it recommends as the best approach for group purchasing to secure sufficient quantity of equipment at lower unit rates	I

APPENDIX A

Letter to workshop participants

Floodplain Harvesting Measurement Strategy – Focus Group Analysis

What we are doing

The draft Floodplain Harvesting Measurement Strategy will be finalised in late November 2019.

Whilst the Department has discussed key components of the new measurement approach at several consultation forums, in-depth feedback is now required to flesh out potential technical and implementation issues and to ensure the measurement system can be rolled out in the smoothest way possible.

To address industry concerns in a structured way, the Department has engaged an independent facilitator with technical expertise to convene industry focus groups.

The independent facilitator will be seeking the views of industry stakeholders representative of both small and large scale irrigation farms from different parts of the northern basin and other key representatives to make sure the measurement strategy has identified and responded to gaps, is practical and operational.

Why are we doing it

Broad stakeholder consultation sessions are challenging forums to have constructive and in-depth discussions. They are both too large and too diverse in representation and practical comprehension.

Focus groups allow for a deeper conversation and discussion about practical issues of the draft Strategy among a small group of individuals. They help elevate the voices of those who are directly affected by the project, achieving a more equitable evaluation and a nuanced understanding of the program's impact.

Focus groups also provide a comfortable medium for floodplain harvesters to share information, which maximises disclosure. Focus groups help obtain answers that go beyond what can be gleaned in broad stakeholder sessions, and really begin to delve into the 'why and how'. This leads to higher quality feedback and outcomes.

How we are doing it

The Department has engaged the expertise of consultant Fifteen50 to facilitate 3 focus groups.

Fifteen50 have a long history in water reform and have been involved in various large scale irrigation projects involving metering and telemetry and have been key players in projects across NSW and Qld in understanding irrigator water take behaviour, identifying and quantifying on-farm storage losses, inflows and outflows. They are Certified Meter Installer/Validators with a wealth of experience in the installation of meters in the non-urban context, particularly in large-scale irrigation properties across the northern Murray-Darling Basin and central Qld.

The Department will provide a list of eligible floodplain harvesters and other key irrigation stakeholders to Fifteen50 and they will be responsible for selecting participants using the following criteria:

- Participants are representative of both small and large irrigation operations.
- Participants are spread over a large geographical area (to ensure different structures and landscape contexts are considered).
- Participants have good operational knowledge of floodplain harvesting measurement
- Participants are willing to participate in the focus group for 1 whole day, including follow-up.

Groups will comprise of 6 individuals and these will vary at each session to ensure a broader reach of opinions and feedback.

When we are doing it

Fifteen50 will be contacting individuals in late November, providing a 2 week notification. The focus groups will be conducted on the following dates and locations:

11 Dec 2019 - Moree focus group

12 Dec 2019 - Bourke focus group

13 Dec 2019 - Dubbo focus group

APPENDIX B

Workshop presentation

Floodplain Harvesting Measurement – Focus Group Analysis

Dean Delahunty – Director

Nathan Heinrich – Director

December 2019

Our agenda

- Introductions
- Presentation from Fifteen50 (half an hour)
  - how have we arrived here?
  - what are the objectives of focus groups?
- Facilitated discussion – What are the key issues for you? (half an hour)
- The Strategy - presentation and discussion (quarter hour)
- Application of the Strategy – introduction of the scenarios (quarter hour)
- LUNCH (half an hour)
- Feedback - We would like to openly discuss your views on scenarios (one hour)
- Review – Have we covered the objectives and received your feedback? (half an hour)

Introduction

Terms of Reference for focus groups

- Fifteen50 Consulting are conducting sessions as an independent party
  - DPIE has engaged us because of our technical expertise
  - The strategy has been made available to us to understand the basis for its development
  - Nathan and I are water resource engineers – our aim is to speak to you in a common language
- Participants have been selected by Fifteen50 based on criteria agreed with DPIE
- Our role is to road-test the various elements of the draft measurement strategy to make sure that
  - its practical to implement,
  - it does not have any gaps and
  - it will not result in any unintended consequences for industry.
- We will be providing advice back to DPIE on any material issues that have been raised that we think should be addressed prior to measurement strategy being finalised or during its implementation phase. Our advice will contain recommended solutions for overcoming these issues and will be based on your feedback and our own skills and experience.
- DPIE has advised us that they will make copies of our report available to all attendees once it has been finalised.

Introduction

- In scope:
  - We would like to listen to your position
  - We want to identify key issues / concerns
  - We are gathering information about the draft strategy
  - We have developed scenarios for testing the strategy
  - We are going to report on ideas and improvement opportunities
- Out of scope:
  - We are not here to deal with legalities
  - We are not going to discuss issues with the MDB Plan
  - We are not about changing existing legislation / regulation
  - We will not be selecting technology to be adopted

Our simple rule for today

Feel free to raise an issue

We only ask that it is followed with a solution

The policy context – how did we get here ?

- Historic arrangements mean that take of water from the floodplain has not been licensed and has not been monitored
- MDBA Compliance Compact 2018 – An agreement to implement FPH measurement, delivered through Healthy Floodplain Project and Natural Resources Access Regulator Board
- Water availability / reliability – communities would like certainty and accurate measurement and accounting supports this aspiration

The policy development process?

- Healthy Floodplains Project have developed a draft measurement strategy over a period of time
- Eligible floodplain harvesting properties identified for licensing
- Consultation sessions have been conducted on a range of topics
- Floodplain harvesting access licences to be measured primarily at storages

Effect of the policy => ~600 properties

~1400 storages

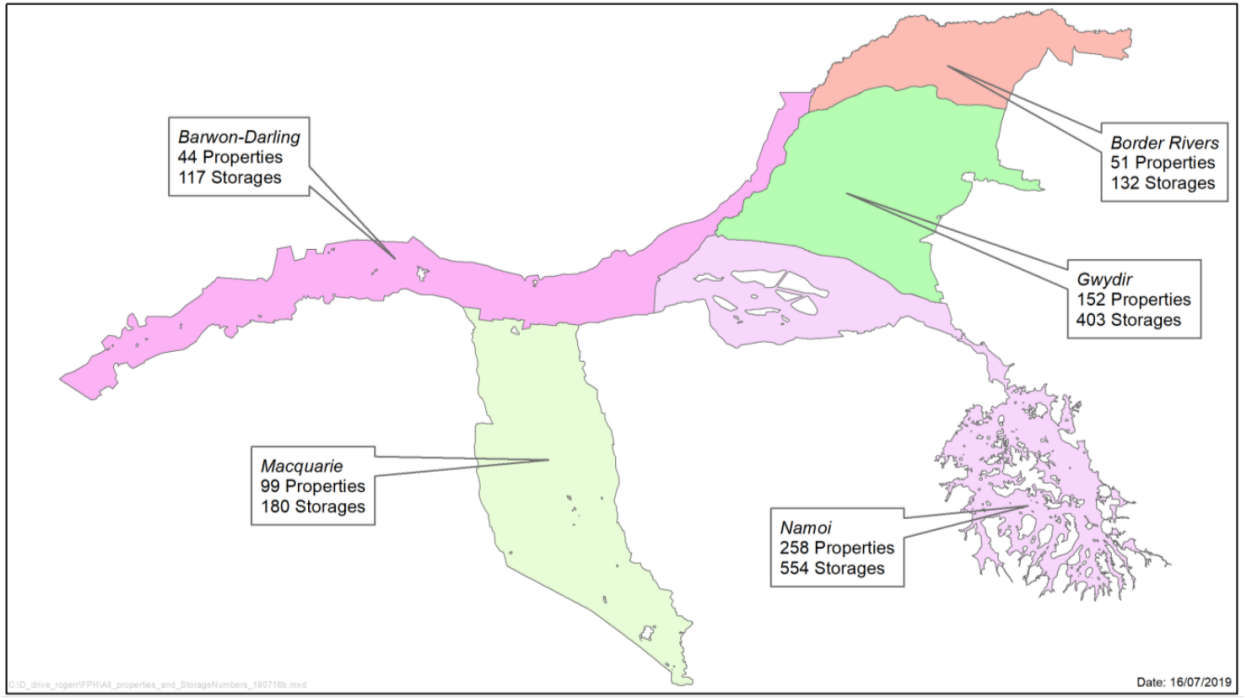


Figure 1. Summary statistics for floodplain harvesting properties and storages in the Northern Basin.

Key strategy objectives to test today

Strategy aspect	Metric	Guidance on how to measure
	Practical	Balance between implementation vs ongoing effort Robust framework for application
	Cost effective	There will be some cost to implement Fair and equitable - how to rank?
	Safe implementation	Qualified persons to install metering
	Integrity of data	Accurate, reliable and tamper proof
	Informs farming decisions	Data to / from farm (telemetry)
	Landholder calculations	Data allows qualification of changes in storage level – how much data collection is useful for farm management?
	Program evaluation	>90% floodplain harvesting water measured
	Identification of triggers for compliance	Withstand public scrutiny Continuous calibration of data sets required

Accounting method overview

FIFTEEN50

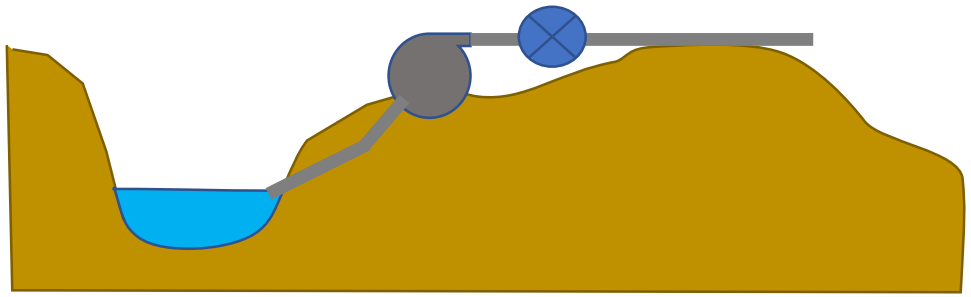
Water Access License accounting

Data repository and processing

i-WAS

One transaction point

Continuous flow signal / count

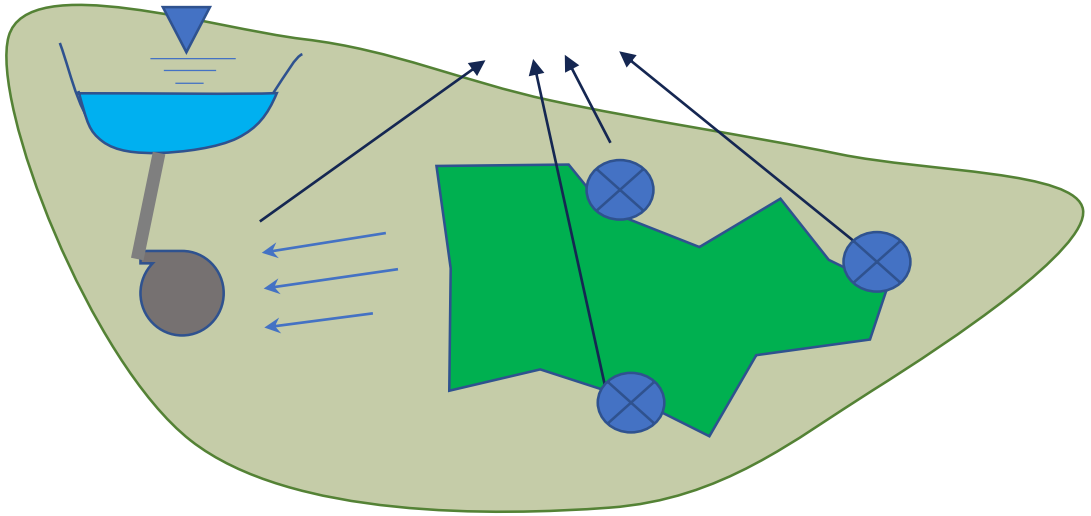


FPH accounting

Data Acquisition Service

i-WAS

Farm calc's



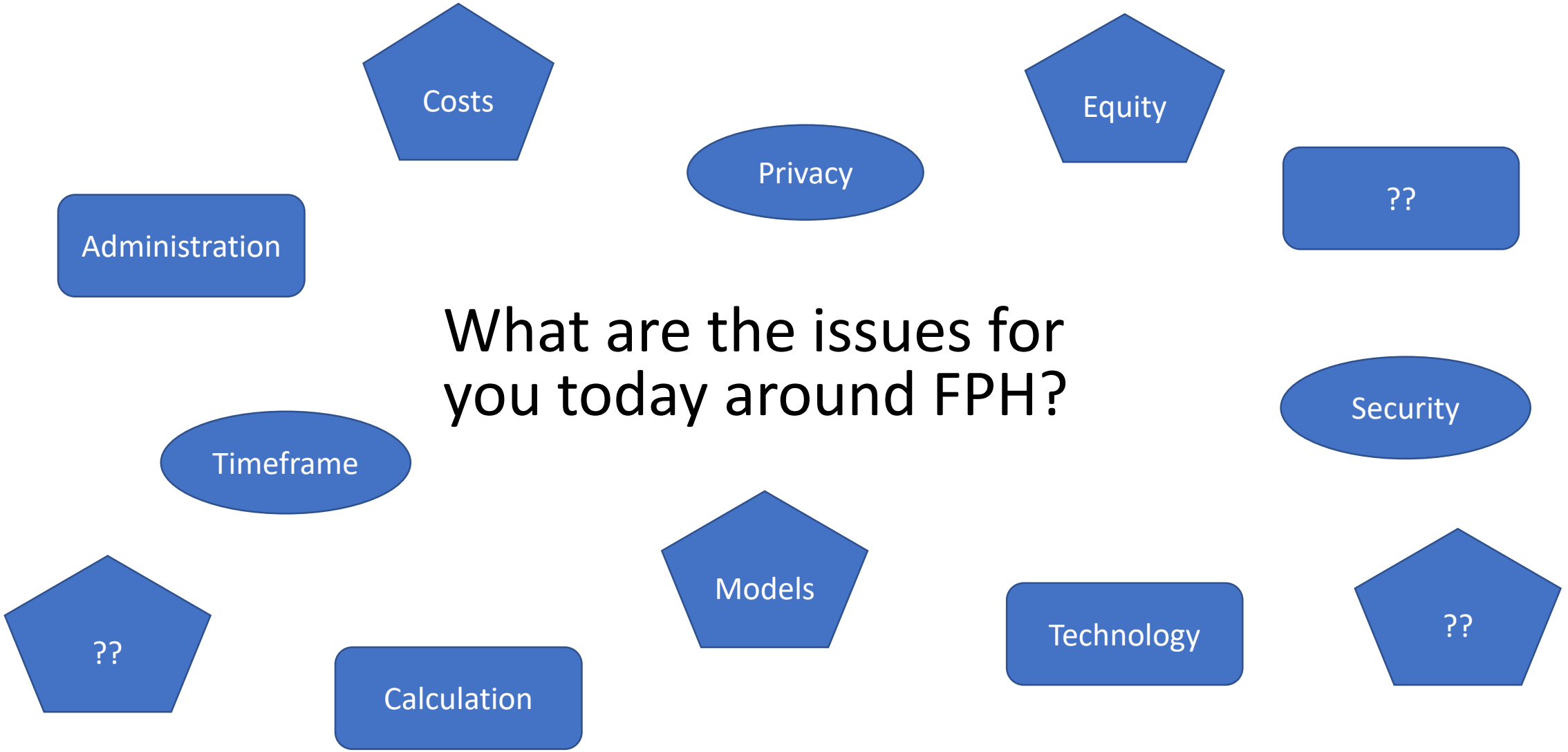
What issues have been addressed to date?

- Rainfall runoff from developed areas – this has been excluded from FPH harvesting take (at certain times), opportunity to move tailwater to storage pre-event.
- Gauge boards – an evaluation has concluded that better technology will be adopted
- Field storage – can be used although must be nominated and should be calculated
- Measurement accuracy – meets minimum acceptable specifications
- Costs – individuals to bear costs of installing level monitoring
- Storage device failure – 21 days to rectify
- Grandfathering – this will be allowed with some qualifications
- Installation – qualification required for installers

Strategy development to date has attempted to balance accuracy of measurement with cost/administrative burden/implementation challenges

What other issues might be addressed to maintain accuracy and mitigate these challenges?

Key issues (interactive feedback)



Key elements of the Strategy

- A Landowner MUST nominate a start and end time of FPH event activity
- Farm storages are the central and non-negotiable measurement point:
  - Landowners MUST nominate storages on their work approval for floodplain harvesting
  - Rating of level / capacity per storage
  - Level measurement in storages (automated sensors)
  - Data packages are sent back to central processor
- Accounting - a new process for determining take per event based on a start / end time nominated by landowner
- Farm operational factors:
  - Rainfall runoff within farm – Storage of on-farm runoff may increase storage level but accounting methods will only be relevant during a nominated FPH event
  - Take estimated into temporary storages
  - Take into surge areas, supply channels, tailwater drains not measured nor estimated

Key elements - nomination

- Landowner nominates an FPH event
  - Must report to iWAS the start time/date of FPH take
  - Nominate start of FPH take before water is taken
  - Nominate end of take to iWAS to define the measurement period
    - OR period assumed to end 14 days after start
    - OR when FPH take into a storage ceases (whichever is longer)
- Discussion
  - Practicality
  - Evidence requirements
  - Passive FPH take vs. active FPH take

Key elements – measurement

- Measurement at the storage
  - Must nominate storages for FPH in works approval
  - Rating of level / capacity per storage (provided by DPIE)
  - Level measurement in storages (automated)
- Discussion
  - Device installation location to access lowest point
  - Gauge zero / dead storage
  - Dry storage profile fill
  - Mobile coverage
  - FPH not pumped to storage
  - Accuracy – storage curve, device resolution
  - Existing equipment grandfathering

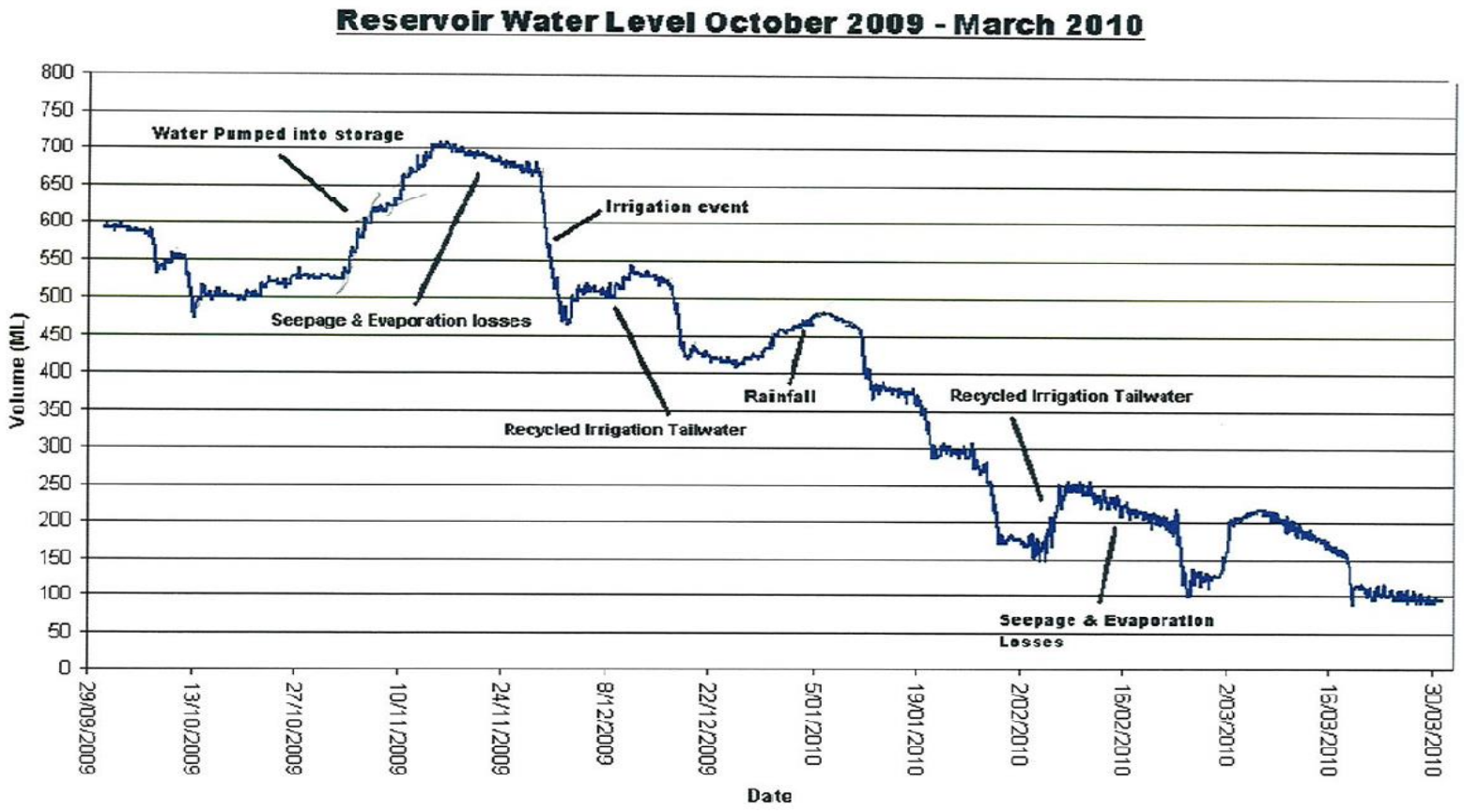
Key elements – temp. storage

- Field storage / temporary storage
  - Volume is estimated via pump / pipe standard capacity tables
  - Choice to meter
  - Must be nominated on FPH works approval
- Discussion
  - Definition of temporary storage
  - Supply channels, surge areas not required to be measured
  - Passive FPH take vs. active FPH take
  - No pump/pipe?
  - Accuracy of estimate vs. relative volume of FPH taken in this way
  - Accounting for blowout volume
  - Alternative options to estimate take?

Key elements - accounting

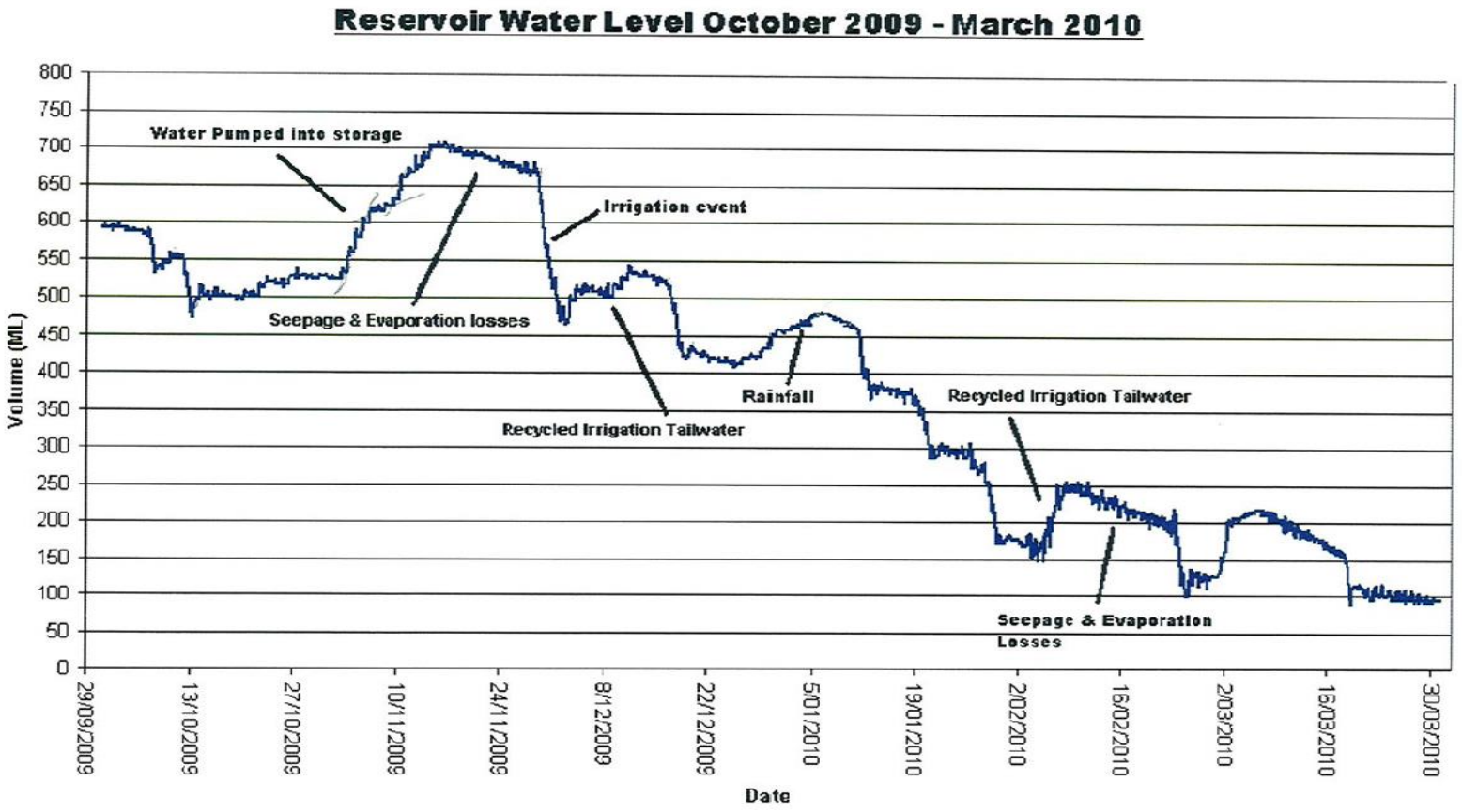
- Storage device will record ALL water coming into storage
  - FPH take = storage increase ML + take into field storage ML – take under other licences ML during the measurement period

You may need to justify every storage volume movement



Key elements - accounting

- Discussion
  - Time and effort impost
  - Justify non-FPH otherwise all increases are counted as FPH during a nominated event
  - Year-round accounting for compliance and audits
  - Landholder capability to undertake detailed accounting
  - Information value to landholder
    - Potential for improvement to farm management and water use efficiency
    - Or just more red tape?
  - FPH take to be reported to iWAS within 42 days of event



Case study farms

- Assessment of case-study farms to test objectives
- Key aspects to consider
  - When to nominate a FPH event? Controlled vs. uncontrolled take
  - Automated measurement at the storage
  - Temporary storage
  - Rainfall runoff from developed areas
  - Accounting
  - Costs of implementation – reasonable compared to alternatives?

Implementation

- Enforcement of FPH licensing framework begins Q3 2021
  - What are the challenges in FPH licence holders meeting measurement rollout 1 July 2020-21?
- Discussion
  - Procurement / costs of storage device, telemetry and installation – market capacity
  - Availability of certified installers
  - How might DPIE help with implementation challenges?
  - Assistance – if available, what principles would be fair and equitable to improve rollout efficiency?

Close out actions

Policy aspect	Metric	Feedback / Comments?
	Practical Cost effective Safe implementation	
	Integrity of data Informs farming decisions Landholder calculations Program evaluation	
	Identification of triggers for compliance	
	Complete during lunch break	

APPENDIX C

Workshop feedback and analysis

Table 5: Industry representatives' workshop – Moree

Key aspect of Strategy	Feedback recorded	Assessment and conclusions
Nomination		
Definition of start / end date	• The requirement to nominate before an event starts is not feasible in many cases. Ability to nominate within 24 hours of start of event would address this • Nominated event needs to allow for tailwater/rainfall runoff to be pumped into storage first • Need 14 days after measurement period to transfer all FPH to storage i.e. after FPH event is over when external water not coming into the property but conveyance water still being pumped • Need stronger guidance on how to nominate an FPH period. A set of industry guidelines to define best practice is required • There is a role for irrigation industry groups to inform / remind landholders to measure/notify, etc. when an FPH event is expected to occur (i.e. local, district or valley-scale major rainfall event) • In cases where FPH take is concurrent with an announced supplementary flow event (i.e. two types of water into the same channel conveying to storage) the ability to nominate between supplementary take or FPH is required.	The concept of nominating the commencement time for an event was cautiously accepted but property specific elements of the concept led to a number of concerns around compliance. A clear set of guidelines would provide clarity for landowners around how and when to nominate the start of an FPH event. In particular these guidelines should incorporate guidance or examples for properties where there is no physical separation of developed area rainfall runoff and FPH water.
Evidence of nomination	• Clarify and communicate what is acceptable evidence to justify the notification of the start/end of an FPH event; with reference to NRAR compliance. A set of industry guidelines to define best practice is required • Industry bodies can work with NRAR to provide guidance on acceptable evidence suitable to support notification.	A clear statement could be readily developed to guide landowners as to what evidentiary documentation is required to satisfy compliance requirements.
Developed irrigation area runoff / Contaminated Agricultural Runoff (CAR)	• Un-leveed properties cannot easily separate rainfall runoff from FPH take – difficult to nominate the start point of FPH take external to the property • CAR provisions are still required despite the definition of non-FPH developed area runoff. Property examples that have uncontrolled FPH take / not leveed from the floodplain may breach licenced volume and if there is any reduction in licence volume or allowance model inaccuracy • Overhead irrigation areas should be included as non-FPH developed area rainfall runoff as CAR provisions apply to these areas also • Is an on-farm rain gauge sufficient evidence for rainfall runoff? As some heavy rainfall events are not recorded by BoM stations.	Given the policy was only introduced at the focus group there was confusion surrounding non-FPH developed area rainfall runoff and how it could be substantiated in cases where it occurs concurrently with the take of FPH water. Communication of the policy and the specific implications to FPH activities would assist understanding of the concept. Landholders may look to install tailwater return systems for overhead irrigation areas for capture of non-FPH developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.
Measurement		
Point of measurement	• At least half of FPH irrigators already monitor their storage volume in some form, with progressive irrigators already employing continuous, electronic depth measurement. Estimate that 200 of the 1400 storages are already instrumented • Consensus that measurement at the storage is a feasible approach • Measurement needs to reflect the FPH infrastructure modelled in licence entitlement determination.	Measurement at the storage as the primary point of measurement was generally accepted, and the concept of having to nominate storages as FPH works was agreed.
Cost of measurement	• No major concerns, however, spending of money on unproven equipment is not cost-effective.	
Use of gauge boards for storage measurement	• A gauge board in the storage is a good backup and an appropriate interim measure whilst electronic measurement and telemetry specifications, equipment, installation standards, etc. are being developed. • Gauge boards were not favoured previously due to the Strategy requirement for daily reporting.	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim application of the Strategy and subsequently as a backup measurement once installation of electronic measurement devices occurs. Installation of gauge boards can be achieved quickly while storages are predominantly empty, at low cost, and sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.
Storage curve and benchmarks	• There is a lack of permanent survey marks available across the valleys to benchmark storage curves to AHD • Use of LiDAR may be over ten years old – is new LiDAR being flown to provide up to date data • Development of storage curves by photogrammetry is prone to error	Storage curves must be benchmarked to AHD for consistency and reliable/enforceable data collection. The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.

	• Landholders need flexibility to provide better information for storage curve preparation (if available from previous surveying).	
Alternative measurement	• The option to meter points of FPH take into the property should be provided, in the case where this is possible and able to be defined through a fixed structure • A pathway is required in the Strategy to provide an agreed solution (NRAR and landholder) for outlier properties to develop a unique measurement philosophy.	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any developed area rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of developed area FPH rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.
Telemetry / data security	• Concerned about data security and potential for misuse by third parties • Concerned about reliability and on-going maintenance cost of telemetry • Telemetry is often beyond the skill set of the duly qualified person – meaning that troubleshooting and repair could be costly / time consuming • Telemetry has more value / ease of use if it can it be integrated into existing on farm systems (if present) • Resistance to pay for telemetry for use by NRAR / Department • Landholder needs to have real-time access to data rather than having to receive it back from the data acquisition service.	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure and maintenance cost concerns are valid. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment • Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.
Unaccounted FPH	• Consensus that the take of FPH water direct to irrigation is generally not common and not a large volume • Unaccounted for water taken into supply channels and the like (i.e. not through a storage where it would be measured) is relative to the size of the property and a small proportion of overall take	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.
Accounting		
	• Storage trace requires a lot of context to interpret. This will be difficult for the landholder to keep enough records for justification, difficult for NRAR to interpret and enforce and can be dangerous in the wrong hands • Data collected is valuable to farm operations and effective water resource management • Rainfall runoff can be foregone during a nominated FPH take event – likely that the take of FPH is much larger volume than any rainfall runoff that may occur during the nominated event • Some properties may have great difficulty in defining the end of rainfall runoff and the start of the FPH event. Guidance will be required on how to define this split and how to estimate the component of rainfall runoff (controlled vs. uncontrolled access to FPH. Uncontrolled access to FPH common in upper valley locations) • There needs to be flexibility / discretion in accounting for tailwater and developed area rainfall runoff	These issues are largely related to the difficulty in nominating the FPH event and the accounting treatment of developed area rainfall runoff. Landholders can use data to be more effective with use of water resources if data can be accessed in real-time.
Temporary storages		
	• Take into field storage is not common and suggest that it be removed from the Strategy as a form of FPH take • A storage is a storage and therefore should be measured accordingly • Any water detained in a field/temporary storage will suffer losses similar if it were in a storage or remaining on the floodplain anyway.	Temporary storage, or field storage, was viewed as being rare and does not account for a large volume of current take. Any structure that stores water should be measured.
Implementation		

Approach to implementation	• Not so much problems with strategy just the implementation of it • We need a flowchart of the process to visualise and see the detail of the steps in implementation • Suggest storage curve verification, benchmark installation and installing the calibrated gauge boards first, as an interim measure, then move to the implementation of the storage devices. Gauge boards then become a backup in event of storage device failure. Gauge boards can go in much quicker than telemetry and therefore message is that FPH is being measured. • Stage the implementation to target the bigger / more frequently used storages for electronic measurement in order to cover the most FPH take. Active storages over the past 30 years can be identified using existing remote sensing data (Geoscience Australia) • Staging of implementation could also prioritise storages with multiple sources, which may be otherwise difficult to determine FPH take using manual gauge board methods • A unique opportunity exists now to get storage work done now whilst most storages are dry (storage survey if required, benchmark establishment and gauge board installation)	The current approach to implementation saw a lot of discussion and feedback. This was interpreted to mean that there is broad acceptance of measurement and the Strategy more generally, with some improvements as discussed above. Participants were keen to see the Department getting on with it however with some practical measures to improve, communicate and stage the rollout, including; moving quickly on storage curve development, benchmarks and gauge boards installation during this unprecedented drought and targeting the most active FPH storages for first rollout of electronic measurement.
Timeframe	• Need sensible roll out timeframes as an achievable goal. Current timeframe is too short to adequately test proposed equipment and to instrument 1400 storages • This could be a sensible rollout strategy given enough time, otherwise landholders are set up to fail with a rushed approach and unproven equipment • Extension to the timeframes are also well justified by the drought, unfair to impose further metering costs on landholders without income • Providing for a smoother workflow will allow local suppliers to provide (as opposed to external providers) and then that capability remains for on-going maintenance and validation.	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant. The issues of drought, immature equipment testing, scale of works and ability for local providers to be involved add to this uncertainty. A rushed implementation with immature equipment will result in a costly white elephant and will be an embarrassment for the Department and the industry. Participants are also unconvinced that the Department will be able to meet the timeframes set out for issuance of FPH licences, which underpin the requirement for measurement.
Equipment specification	• Department needs to finalise the equipment specifications and release these for industry review. Include local suppliers as a reference group for technology adoption – for on-ground feedback on what works in the field and what doesn't • Electronic devices need to be thoroughly field tested and risk assessment undertaken to prove up resilience and reliability – suggest industry partnership to assist in this • Aquatech and GoannaAg meters need to be grandfathered in otherwise there will be a lot of equipment out there that doesn't comply yet still achieves the objective • Maybe small FPH entitlements could adopt a gauge board only for measurement given the lower risk.	The proposed equipment, whilst not new, is not widely employed in the proposed setting of on-farm irrigation storages. The optimisation of the equipment specifications can only occur through collaboration with the industry who have experience in this application.
Market capacity	• All local meter installers are occupied with installing surface water pumps metering – there isn't a lot of local market capacity at present • Important to use local suppliers to assist local economies in drought but a reasonable timeframe is required to allow this • Maybe it's easier to ask landholder to do all installation? Survey, curve, benchmark, install device, etc. It's a simple enough task given adequate guidelines for installation, with independent validation by a duly qualified person.	Independent validation, by a Duly Qualified Person, of works done by others is an effective way to use the limited market capacity available. This will be required anyway, as existing measurement works are independently validated for grandfathering.
Departmental assistance	• Suggest that hardship is not used for application of support/subsidies – it's a minefield • Suggest a flat rate discount for storage measurement works (cost of measurement same regardless of size of storage). Apply rebates retrospectively after works have been completed on a first-in-first-served basis (to encourage implementation by landholders) • Rebates for grandfathered equipment should be made available • Messaging around the subsidy is to improve the implementation rollout rather than funding old technology (gauge boards) • Subsidy –risk vs cost – subsidy could be applied to prioritise the more active FPH storages	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate and will encourage uptake for frequently used storages. Rebates should only be paid upon full completion (storage curve, benchmark and calibrated device installation). Rebates for grandfathered equipment are appropriate and does not penalise early adopters of this type of measurement.
Data availability	• Department should send out storage curves as quickly as possible so landholders can adopt or verify • Verified curves allow a storage to be measurement device ready. Focus on this in the short term.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
Other issues		
FPH Works Infrastructure Plans (WIP)	• Only Gwydir and Border Rivers valleys have seen individual WIPs. Need to get this information out to landholders as soon as possible to verify • It is possible for a landholder to exclude FPH works from WIPs, but this is probably unlikely to occur – if there is any possibility that works can take FPH then it should be nominated	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for

	• There needs to be a comprehensive process of extension to landholders around the development of the WIPs and verification • The Department needs to outline and update the current state of the process for WIP development, release and verification of storage curves and where the entitlement volume determination is up to • WIPs need to allow for separation of properties into individual zones for measurement and accounting. For example, rainfall runoff may be taken on one part of the property whilst FPH occurring on another – the two water sources are spatially independent and therefore developed area non-FPH rainfall runoff can be legitimately taken whilst the FPH event is occurring elsewhere. Acknowledged that transfer of water between farm zones cannot occur during a nominated event as this may avoid measurement	landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.
Levee construction to isolate rainfall runoff from irrigated areas	• Unleveed properties are not all that common however some properties may decide to construct a levee in order to isolate FPH from developed area rainfall runoff • There are restrictions on levee development and height in some valleys (i.e. Border Rivers) so this may not be possible require landholders to build a levee for isolation of FPH and rainfall runoff	The Strategy does not require landholders to build levees in order to better separate developed area rainfall runoff from FPH take. There is confusion that can be clarified with industry guidelines.

Strategy objectives	Metric	Guidance on how to measure	Feedback – does the Strategy achieve the objective?
Measurement methods	• Practical	• Balance between implementation and on-going effort • Robust framework for application	• The Strategy is practical however the timeframes are too short, device and telemetry approach need fine tuning • Simplification of the accounting is a good outcome • The concept of measurement at the storage is easily communicated.
	• Cost-effective	• Cost of implementation • Equity / fairness	• The Strategy is cost-effective if spent on robust equipment that is proven in the field • Use the least cost to achieve the outcome first (gauge boards as interim measure).
	• Safe implementation	• Qualified persons to install metering	• No concerns, endorse this as a principle.
Data quality	• Integrity of data	• Accurate, reliable and tamper proof	• The Strategy achieves this objective however there are questions over the accuracy of the storage bathymetry used to generate the curve.
	• Informs farming decisions	• Data to / from farm (telemetry) • Is the data useful for farm management	• Unsure given the unknown data access limitations from the DAS.
	• Landholder calculations	• Data needs qualification for movements in storage level	• Unsure given ambiguity in the definition of an event and FPH take (timing of nomination) • Need clarity on calculation equation and WIP inclusions.
	• Program evaluation	• Aims to measure more than 90% of FPH take	• The Strategy will likely achieve this however change the language that all FPH is measured to an accuracy of 10%.
Data quantity	• Identification of triggers for compliance	• Withstand public scrutiny • Continuous calibration of data sets	• Data collection is good but it is meaningless without context and evidence of what was going on on-farm.

Table 6: FPH landholders workshop – Moree

Key aspect of Strategy	Feedback	Assessment and conclusions
Nomination		
Definition of start / end date	• Industry guidelines on how to nominate the start of the event are required in order to know if compliance is being achieved (as monitored by NRAR) and defendable • Desire to nominate start and end dates in short timeframes if property configuration allows; there is confusion over the definition of the 14-day event duration.	The concept of nominating the commencement time for an event was cautiously accepted but property specific elements of the concept led to a number of concerns around compliance. A clear set of guidelines would provide clarity for landowners around how and when to nominate the start of an FPH event. In particular these guidelines should incorporate guidance or examples for properties where there is no physical separation of irrigation tailwater and PFH water.
Evidence of nomination	• Industry guidelines required as per feedback above.	A clear statement could be readily developed to guide landowners as to what evidentiary documentation is required to satisfy compliance requirements.
Developed irrigation area runoff / Contaminated Agricultural Runoff (CAR)	• The increasing use of overhead irrigation and traditional surface irrigation tailwater systems are confusing for understanding of the non-FPH developed area rainfall runoff. Contaminated runoff should be captured from overhead irrigation areas and should be considered non-FPH developed area runoff.	Given the policy was only introduced at the focus group there was confusion surrounding the definition of non-FPH developed area rainfall runoff and how it could be substantiated in cases where it occurs concurrently with the take of FPH water. Communication of the policy and the specific implications to FPH activities would assist understanding of the concept. Landholders may look to install tailwater return systems for overhead irrigation areas in order to capture developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.
Measurement		
Point of measurement	• Will the Department issue a farm monitoring plan that outlines where and what is to be measured? • The timeframe to notify and replace a broken meter is a concern – 21 days is too short. Will a landholder be instructed to cease take if meter is broken? • Definition of surge areas needs to be clear. Extensive discussion around estimates vs measurement • Desire to implement a review process / committee to review Department response to identified anomalies (measurement approach for unique properties)	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. Clarity on the function of the WIP as it pertains to monitoring is required, with landholders to be informed that only storages identified on the WIP require measurement. Further clarity on the definition of a surge area is also required and generally relates to the amount of time that water is detained prior to pumping to permanent storage. 21-day period for replacement of a broken meter is consistent with WaterNSW practice. There is an ability to extend this timeframe in extenuating circumstances. Landholders need to be made aware of the conditions surrounding the ability to take FPH if measurement equipment has failed, with clear guidelines on backup data collection to evidence take. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.
Cost of measurement	• A “small” irrigator does not necessarily mean a small metering cost (i.e. the small volume could be spread over a number of small storages) • The cumulative cost of metering on some properties becomes quite significant between surface water pumps, FPH, groundwater, etc.	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is negligible compared to the production value of the water (refer Section 5.3).
Use of gauge boards for storage measurement	• Gauge boards – should be mandated as practical and a cost-effective back up (cost not an inhibitor)	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is “getting on with it”, a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.
Storage curve and benchmarks	• Issue storage curves as soon as possible in order to re-establish irrigator trust of Department for verification	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.

Alternative measurement	• Water lap mark in the storage is a foolproof measure of how high the storage was filled to during an FPH event • Point of take measurement is a desirable option where it can be adopted for given properties.	Measurement of the water lap mark is reliable, however is a manual assessment and may provide for anecdotal justification of take only when all else fails (even a gauge board). It is not particularly accurate nor practical to include as part of the Strategy. The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.
Telemetry / data security	• Logger needs a Human-Machine Interface (HMI) for easy read out on site and a green/red light to show whether its working or not • If telemetry fails (and often does) then the logger must still work and then the gauge board can be used as a last resort • Landholder must have access to storage meter data in real-time • Concern about the cost of telemetry access ongoing – monthly charges add up over several storages; particularly those that are infrequently used • Mobile coverage or satellite coverage is a challenge for telemetry across large parts of the valleys • Alternative to telemetry on field storages – some participants were happy to pay charges for having NRAR staff manually download data at sites after FPH events rather than have telemetry. Source of employment for the community • Data security was a concern and query raised about how the Data Acquisition Service protects individual's data.	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure and maintenance cost concerns are valid. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment • Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.
Unaccounted FPH	• The situation where FPH is not directed to storage (and therefore avoids measurement) was considered a rare or unlikely occurrence.	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.
Accounting		
	• Unwillingness to pay for Departmental automation of calculations – landholders can do it. The functionality of how the DAS automates calculations is not clear • Upper valley properties often have uncontrolled take of FPH water along with rainfall runoff and tailwater, making it difficult to separate and account for • How is Basic Landholder Rights water managed under the strategy? It should be deducted as non-FPH in annual take • Concern was raised about exceeding the multi-year accounting trigger (five-year, or 500% limit) if passive storages (uncontrolled take) are filled multiple times in short period. Discussion was held about whether the 100% debit for rainfall runoff should be in or out • Accounting for FPH during announced supplementary take events – the ability to decide what water is which should be allowed • Clear rules around capacity to transfer between storages are required. Is this permitted during FPH events?	These issues are largely related to the difficulty in nominating the FPH event and the accounting treatment of developed area rainfall runoff. Landholders can use data to be more effective with use of water resources if data can be accessed in real-time. Further clarification is required on the status of BLR water, the take of supplementary water and the ability to transfer between storages, as it pertains to accounting for FPH take, particularly when concurrent. Participants are unaware of the Department's position on multi-year accounting and account debit provisions (if any).
Temporary storages		
	• The scale of temporary storages should be considered in whether to instrument for measurement – suggestion that a trigger (such as > 500ML) should be applied • Mixed views on whether temporary storage areas outside of the developed irrigation area should be metered or not. Important to understand where does external water end up, when deciding whether temporary storage has been created by development. If the only option is for floodplain water to end up in a storage, then it is reasonable to measure it (with gauge).	Temporary storage, or field storage, was viewed as being rare and does not account for a large volume of current take. Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage, which generally relates to the amount of time that water is detained prior to pumping to permanent storage.
Implementation		

Approach to implementation	• If implementation is rushed, then project outcomes will be poor i.e. pink batts situation.	The timing of various water reform initiatives underway is making it difficult for individuals to evaluate their obligations and many see the implementation phase as being rushed and ill-prepared. There is a need to clearly outline the process of implementation and to provide enough time for outstanding issues to be resolved.
Timeframe	• Extend the timeframe out – install gauge boards as interim measure, then follow with data loggers later. Once electronic measurement is in place, the gauge boards are a good backup and easy reference on-site (for landholders and NRAR) • Concerned about the timeframes and pushing irrigators too hard in an unprecedented drought • Communication of roll-out timeframes – absence of communication is causing concern in the industry • Smaller irrigators need more time to install as the cost of metering relatively higher • Extending the timeframe allows for adjustment to all implementation challenges and to allow for exceptional circumstances due to drought (little capacity to pay)	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant. Participants felt that the absence of communication regarding implementation is adding to their sense of uncertainty. There was strong feedback about the interim use of gauge boards that become a backup for future electronic measurement.
Equipment specification	• Industry requires the specifications for storage devices, loggers and telemetry and to understand the timeframes for this information relative to the implementation rollout timeframe.	The minimum requirements / specifications for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.
Market capacity	• The same market required for FPH measurement is already busy (and behind timeframes) with surface water pump metering – there is little capacity to deliver in a short timeframe as required • Spread out the installation / validation timeframes / return periods to allow local market to deliver • Get the NRAR staff to install – drought means there should be spare capacity.	Lack of current market capacity is a threat to the implementation timeframe and options to make best use of the available capacity should be explored (i.e. independent certification of works done by others). The use of NRAR staff to install is tongue-in-cheek perception that they are not busy given the drought.
Departmental assistance	• Department to provide 0% loans to install (perhaps as drought assistance) or a payment plan approach. Include all aspects – survey, benchmarks, gauge boards as well as electronic equipment • Suggest use of an early bird discount • Any subsidy should be applied on a per meter basis (unit rate) • Department to consider group purchasing of equipment to take advantage of economy of scale.	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate, perhaps inclusive of an early bird discount, and will encourage uptake for frequently used storages. Drought assistance of 0% loans or payment plans are also appropriate. Group purchasing, by the Department or industry bodies, is an effective way to secure large quantities of equipment at lower unit rates.
Data availability	• Issue storage curves as soon as possible in order to re-establish irrigator trust of Department for verification.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
Other issues		
FPH Works Infrastructure Plans (WIP)	• Water infrastructure plans (WIPs) – not universally understood and the process is seen as sluggish for those that have been involved • Different property units should be managed / notified differently on WIPs to address spatial scale (i.e. if RRO being collected at one end of the farm and FPH taken in the other. More understanding is required around the WIP development process – would like to recognise spatial extent and complexity of property in WIP • The modelling (for licence determination) is undermined by the fact that WIPs aren't complete and issued out to irrigators. Provide an update as to the progress of WIPs and get these out to irrigators as soon as possible.	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.
Coordination with Qld	• Correlate/coordinate with Queensland in the approach to measurement especially with use of gauge boards.	Collaboration with Queensland on the approach to measurement is a key element to ensure consistency across state borders and is already well established.
Transparency	• Attendees wanted to see a copy of the draft report post workshop as they feel previous consultations have been misrepresented in formal records.	Attendees were advised that a copy of this report would be made available prior to finalisation.

Strategy objectives	**Metric**	**Guidance on how to measure**	**Feedback – does the Strategy achieve the objective?**
Measurement methods	• Practical	• Balance between implementation and on-going effort • Robust framework for application	• An option to use point of take measurement would add a practical element to the Strategy • There are reservations about how practical the Strategy is until some of the anomalies are clarified / resolved
	• Cost-effective	• Cost of implementation	• It is difficult to understand whether Strategy is cost effective or not as there is no license / entitlement volume to compare to

		• Equity / fairness	• Cost of telemetry – if the ongoing costs are incurred during events then yes, otherwise there is a lot of monitoring data being collected between floodplain harvesting events that is costing money for no gain
	• Safe implementation	• Qualified persons to install metering	• Not applicable to group
Data quality	• Integrity of data	• Accurate, reliable and tamper proof	• Having redundancy in the form of backup gauge boards was perceived as a good addition to Strategy to ensure integrity of (backup for) electronic systems
	• Informs farming decisions	• Data to / from farm (telemetry) • Is the data useful for farm management	• Driver is for instantaneous data – not necessarily confident this is being delivered • Need real time access in order to inform farm decisions. Most farms already doing some sort of water budget • An on-site means of viewing level readings and operability of gauge would assist landowners to know they are collecting data
	• Landholder calculations	• Data needs qualification for movements in storage level	• No further concerns additional to the accounting issues raised above.
	• Program evaluation	• Aims to measure more than 90% of FPH take	• Recommendation to use language defining a 10% error band rather than 90% of FPH take is measured.
Data quantity	• Identification of triggers for compliance	• Withstand public scrutiny • Continuous calibration of data sets	• Desire is to not please everyone, rather ensure agreed standards and legal requirements are met

Table 7: FPH landholders workshop – Walgett

Key aspect of Strategy	Feedback	Assessment and conclusions
Nomination		
Definition of start / end date	• Extension assistance is required for landholders to work through how to nominate start of FPH events • Need to have clearer position on landholder ending an FPH event for rainfall runoff take. 14 days is seen as too long – why was this timeframe selected? • Concern about NRAR's interpretation of FPH take vs developed area rainfall runoff and how this compliance will be enforced.	The concept of nominating the commencement time for an event was embraced but the way of determining the end date was challenged. Nomination of end time rather than nominal period would provide flexibility to operate properties to manage FPH as one of many inputs to a farm water balance. A clear set of guidelines for FPH event nomination (start and finish) is required to address these issues. Clarity on this will also give landholders more confidence on NRAR's compliance approach to developed area rainfall runoff.
Evidence of nomination	• Significant concern over not knowing what standards are required for evidence in compliance checks. Concerns that the standards are at NRAR's whim • There was interest in having an appeals process if irrigator didn't agree with NRAR assessment.	Evidentiary requirements that would satisfy compliance activities need to be clearly stated with an appeals process established to challenge NRAR assessment of FPH take.
Developed irrigation area runoff / Contaminated Agricultural Runoff (CAR)	• No additional, specific feedback however non-FPH definition of developed area runoff seen as a positive improvement that also simplifies the Strategy.	Nil.
Measurement		
Point of measurement	• Is there a minimum size of storage that needs measurement? Perhaps very small storages could have alternative measurement • Storages split into cells for water efficiency – this will require multiple sensors and adds cost. Is there a better way? • 21 days to rectify a broken storage sensor is too short and will result in landholders breaching their conditions of licence • The use of data loggers with a gauge board backup was positive • There should be a grace period for take of FPH in event of equipment failure, i.e. no cease to pump rules if metering is down (but with appropriate alternative justification such as gauge boards) • Need an outlier's pathway in the measurement Strategy to handle the unique property examples not adequately addressed	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. A gauge board backup is a useful addition. Multiple cells require separate measurement and this additional burden is acknowledged however the benefits to water use efficiency outweigh the cost. Consideration should be given to alternative measurement for very small, infrequently used storages where the costs of measurement are proportionally much higher – this could be a flow meter on the pump, or a simple gauge board measured on a per event basis. This could be addressed if an outlier's pathway was included in the Strategy. 21-day period for replacement of a broken meter is consistent with WaterNSW practice. There is an ability to extend this timeframe in extenuating circumstances. Landholders need to be made aware of the conditions surrounding the ability to take FPH if measurement equipment has failed, with clear guidelines on backup data collection to evidence take. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.
Cost of measurement	• $5,000 per meter may not seem much but when required for multiple storages, in a drought, on top of the cost of surface water pump metering, the cumulative effect is significant	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is considered minor compared to the production value of the water (refer Section 5.3). The cost of measurement may be mitigated as part of implementation with an extension to the timeframe and the use of subsidies and assistance as detailed below.
Use of gauge boards for storage measurement	• Gauge boards are quick to implement and useful backup for electronic equipment	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement. This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.
Storage curve and benchmarks	• Create a registration process so that existing surveys can be adopted and certified/verified	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.

Alternative measurement	• Suggestion that the Strategy could be made more flexible to allow measurement at point of take.	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any developed area rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of developed area FPH rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this.
Telemetry / data security	• Significant concerns about data security and privacy once collected and held in a government database. There was a view that data was being collected and used on a range of farm activities that wasn't required for compliance and that this operational data could be compromised or used for non-compliance activities • The ability to access live data on a dashboard or application was perceived as an advantage (the way they would like to receive it) • Integrity of telemetry system would make using it difficult – mobile coverage issues • Real-time data is essential to property management – do not see need to have this available for NRAR (they do not require telemetered data access), particularly outside of FPH events. Cost of collecting zero FPH activity data over long periods (sometimes many years) is not cost effective • There is a broader issue with telemetry having been problematic on surface water metering. There is quite a bit of frustration that the technology has many issues and these are not being listened to in experience with metering team. Some would prefer to have boots on the ground (downloading loggers) than telemetry. Despite possible costs there is a view that NRAR are already a cost to them and the collective cost of maintaining monthly telemetry access charges may be equivalent anyway • Don't have an issue with FPH event data going to Govt but it doesn't necessarily require telemetry • Telemetry should be optional for cost/data reliability/integrity/security reasons • Landholder needs to see data at same time as NRAR for use in responding to compliance requests • Why do we need telemetry at all? Just a data logger required. Why add the cost? People coming on farm anyway. Data logger still works even if telemetry fails	Landholders feel they own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure, poor mobile coverage and maintenance cost concerns are valid. Telemetry systems can likely be configured to go dormant during periods when the storage is empty, saving costs on transmission of meaningless data. The adoption of manual data collection by NRAR staff is not cost-effective. This feedback is valid however overreaction to frustrations with surface water metering telemetry that can otherwise be resolved technically. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment • Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.
Unaccounted FPH	• FPH diverted around storages was not seen as a major concern.	The assumption that insignificant volumes of FPH water taken into the property but not transferred to storage appears correct. A property that has a high risk of this occurring should install point of take measurement, and a pathway to allow this should be developed.
Accounting		
	• Basic Landholder Right (harvestable right) is an issue not addressed in strategy. Comment that western division can capture 100% of their own rainfall runoff • Concerns around passive take (uncontrolled take) when licence account has been exhausted, meaning that landholder breaches licence conditions through no fault of their own	Landholders in the western division are able to capture all rainfall runoff and this may present a complication to the Strategy with regard to the definition of non-FPH developed area rainfall runoff. Further clarity on BLR take is required as well as clarity for landholders whose FPH works take water passively and how this is to be addressed when the licenced volume has been exhausted.
Temporary storages		
	• Need clearer guidance on the definition of a surge area and how to measure / estimate FPH take	Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage.
Implementation		
Approach to implementation	• The Department needs to conduct extension to all irrigators explaining what they are required to do in order to comply.	The timing of various water reform initiatives underway is making it difficult for individuals to evaluate their obligations and many see the implementation phase as being rushed and ill-prepared. There is a need to clearly outline the process of implementation and to provide enough time for outstanding issues to be resolved.

Timeframe	• Timeframes are unrealistic – does not demonstrate an understanding of the challenges of drought, other metering programs and costs, etc • The implementation timeframe for landholders should be 12 months after all specifications/requirements/rules/guidelines, etc are finalised. View that with all that the Department has got to achieve in this timeframe that it won't be met. Otherwise the implementation timeframe is squeezed in order to meet a fixed end date, and this is unreasonable • A grace period, or period of discretion, upon implementation and enforcement, is required and particularly on interpretation of data, as landholders become accustomed to the new requirements.	Participants were keen to see that Departmental delays did not transpire to reduced timeframes to complete their obligations. Participants felt that the absence of communication regarding implementation is adding to their sense of uncertainty. There was strong feedback about the interim use of gauge boards that become a backup for future electronic measurement. A grace period should be considered whereby compliance penalties are reduced or waived to allow for landholders to adjust to the new requirements.
Equipment specification	• Actively seek industry involvement in selecting devices, especially if group purchasing is being conducted • Concern that Department specifications exclude GoannaAg equipment as a compliant device, meaning that a lot of existing equipment will not comply • Get specs for sensors, loggers and telemetry out to the industry now	The minimum requirements and specifications for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.
Market capacity	• Desire to ensure local businesses are included in roll-out – keeping money in local economy in a drought period	Engagement with local industry is critical to ensuring market capacity is available for implementation and on-going maintenance. Independent validation, by a Duly Qualified Person, of works done by others may be an effective way to use the limited market capacity available.
Departmental assistance	• Capacity to pay is a major concern at present due to drought – can there be a 0% loan facility / extended payback period offered by the Department? • Group purchasing with industry input to generate procurement efficiency	Subsidies can be difficult to apply fairly. A flat rate rebate on a per storage basis, with first-in-first-served, appears appropriate, perhaps inclusive of an early bird discount, and will encourage uptake for frequently used storages. Drought assistance of 0% loans or payment plans are also appropriate. Group purchasing, by the Department or industry bodies, is an effective way to secure large quantities of equipment at lower unit rates.
Data availability	• Department needs to quickly release specifications on survey, what's acceptable accuracy, equipment specifications, etc.	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
Other issues		
FPH Works Infrastructure Plans (WIP)	• Separation of individual farm units for FPH events is beneficial to manage different water sources (FPH, rainfall runoff, etc.) • Query around the nominated FPH infrastructure and if elements can be removed and added on later – would this result in growth in FPH take? • Extension assistance will be required for some landowners to work through how to establish WIP and FPH infrastructure • There is broad frustration with the process for developing WIPs, with landholders considering they are not accurate, Department is not listening to their feedback to amend – there is suspicion that links with model that underpins the licence determination will not be accurate but landholders have no ability to see outcomes.	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued. The ability to separate a property into individual farm units for FPH appears logical however there must be clearly identified points of isolation between farm units to prevent measurement avoidance of FPH take. This would need to be clearly established in the WIP.
Entitlement determination	• Barwon-Darling landholders main concern is that pumping licences are not calibrated yet on B-D system. This must be addressed prior to FPH measurement • Note that today's workshop feedback is given based on current information available (incomplete) without knowledge of licensing process or volumes from models and that the views could change based on outcomes of that work. • Landholders need to know what the entitlement licence volume will be • Models to determine licence entitlement need to be as accurate as the measurement imposed • Concern around what modelling is being completed on below ground billabongs that take FPH – compliance could be an issue if FPH take is greater than the license without any control or ability to pass this water back to the floodplain. This issue is prevalent in Barwon system. How is this equitable with properties that are not eligible for FPH?	There is significant concern surrounding the accuracy of entitlement volume determination given it is not yet complete. This process needs to be accelerated and brought to completion as a necessary pre-requisite to the application of the Strategy. Further communication and landholder engagement of the process of licence entitlement determination and accelerated completion is required. This communication is to include how passive take into floodplain billabongs have been addressed in the model.
General comments	• Noted that Barwon Darling has been working through these issues since 2007 and nothing has happened since. • Is it possible to change away from the term "Floodplain Harvesting" to something that doesn't imply that we are taking all water in a flood? • Same rules should apply to all landholder in NSW (north and south) • Important to note that the 1912 Water Act and regulations have authorised FPH take. It is not illegal development	The Strategy applies state-wide however is being initially rolled out in the five northern valleys where FPH take is most prevalent. There is obviously frustration with the process that has taken many years and landholders are keen to complete the process to gain certainty and security of their FPH water resource.

	• "Irrigation Australia does not represent us as irrigators" – suspicion surrounds their involvement in the implementation process.		The use of the term "Floodplain Harvesting" is well established and a change away from this is likely to be difficult, will introduce further confusion to stakeholders and potentially raise suspicion from outside interests. Other feedback is noted.
Strategy objectives	**Metric**	**Guidance on how to measure**	**Feedback – does the Strategy achieve the objective?**
Measurement methods	• Practical	• Balance between implementation and on-going effort • Robust framework for application	• Strategy is more practical than previous versions and appears simple enough if our feedback is adopted and qualifiers resolved.
	• Cost-effective	• Cost of implementation • Equity / fairness	• Not convinced. Cost effectiveness improved if use of existing equipment is allowed (grandfathering of out of spec equipment e.g. GoannaAg). Not cost effective for small areas/small volume FPH. Perhaps these small storages could use a log-book type approach (perhaps with a maximum trigger volume?). The approach needs to be the same for everyone after that.
	• Safe implementation	• Qualified persons to install metering	• Allow independent certification of works done by non-duly qualified persons – allows for work to be done by a wider group of people but maintains quality via verification.
Data quality	• Integrity of data	• Accurate, reliable and tamper proof	• Not yet convinced that system will provide privacy for data acquired, particularly once accessed and held within NRAR.
	• Informs farming decisions	• Data to / from farm (telemetry) • Is the data useful for farm management	• Data loggers and telemetry would be good to have for on-farm but not convinced they need to provide data to / from the Data Acquisition Service – telemetry and data collection reaching too far.
	• Landholder calculations	• Data needs qualification for movements in storage level	• Similar to above.
	• Program evaluation	• Aims to measure more than 90% of FPH take	• 90% figure is ok. Reserving opinion on this until the final FPH licence volumes are known.
Data quantity	• Identification of triggers for compliance	• Withstand public scrutiny • Continuous calibration of data sets	• The Strategy needs to withstand public scrutiny, but it shouldn't be the main driver • Seen as a good thing to have a structure in place but not universally agreed that it is required (with telemetry) to ensure compliance • Hard to accept a gold-plated system of measurement just to satisfy public perception.

Table 8: FPH landholders workshop – Dubbo

Key aspect of Strategy	Feedback	Assessment and conclusions
Nomination		
Definition of start / end date	• How is an FPH event nominated when irrigation tailwater commonly mixes with FPH water in lower Macq farms? How to evidence this deduction from the accounting? • Individual required to specify local FPH event. There will not be announced FPH events (although this could work in lower Macquarie where events are generally valley-scale) • Landholders require guidelines on how to nominate a FPH event.	The concept of nominating the commencement time for an event was not universally accepted by the focus group. The driver for disagreement was the isolation of properties from the floodplain associated with flood protection works. Although nomination of a start date was cautiously accepted the way of determining the end date was challenged. FPH events in Lower Macquarie can extend for long duration and FPH activity can be stop/start based on rainfall events. Irrigation can continue while there is a flood. Nomination of end time rather than nominal period would provide flexibility to operate properties to manage FPH as one of many inputs to a farm water balance. A clear set of guidelines for FPH event nomination (start and finish) is required to address these issues. Clarity on this will also give landholders more confidence on NRAR's compliance approach to developed area rainfall runoff and tailwater from irrigation. Given the nuances in the lower Macquarie whereby FPH events are generally widespread, local industry bodies could play a pivotal role in ensuring members abide by rules when an FPH event is expected or underway.
Evidence of nomination	• No additional, specific feedback to that above.	Nil.
Developed irrigation area runoff / Contaminated Agricultural Runoff (CAR)	• Rainfall records may be too far away to be useful record. Will on-farm records be sufficient to justify a developed area rainfall runoff event? • Developed irrigation area rainfall runoff– there is a grey area in the strategy with regard to overhead irrigation. No tailwater return system yet rainfall runoff is enhanced by irrigation in the same way as surface irrigation. Currently the Strategy does not allow capture from these areas but it should be allowed – does a tailwater return system have to be constructed to permit this? • In a large rainfall event, if rainfall runoff is blown out directly to downstream neighbour, is this FPH? Or non-FPH developed area rainfall runoff? This blow out is the result of artificial irrigation process so its not necessarily FPH. Question to answer.	Given the policy was only introduced at the focus group there was confusion surrounding the definition of non-FPH developed area rainfall runoff and how it could be substantiated in cases where it occurs concurrently with the take of FPH water. Clarity is required on the status of rainfall runoff if blown out to downstream neighbour – the current definition would suggest it returns to being FPH. Communication of the policy and the specific implications to FPH activities would assist understanding of the concept. Landholders may look to install tailwater return systems for overhead irrigation areas in order to capture developed area runoff; however, this is probably a beneficial outcome with CAR captured. Volumes of rainfall runoff from overhead irrigation areas are likely less than from surface irrigation with more precise control of soil moisture deficits.
Measurement		
Point of measurement	• Overkill to instrument infrequently used storages. • The use of cells in storages for water efficiency means that multiple devices are required for measurement, which in some cases significantly increases cost • Why doesn't the Dept keep a stockpile of suitable devices ready for quick supply in the event of a failure, so an irrigator isn't prone to breaching the rules if a device fails?	Measurement at the storage is generally accepted, with storages having to be nominated as FPH works. Multiple cells require separate measurement and this additional burden is acknowledged however the benefits to water use efficiency outweigh the cost. Measurement of infrequently used storages appears unnecessary to landholders however even if only filled once every 10 years, the cost of instrumentation is still relatively small (i.e. a few $ per ML taken). In time the market is expected to be able to maintain adequate stock of equipment for ready replacement. An extension to the repair period for a limited time post-implementation would be helpful to allow the local market capacity to establish and mature.
Cost of measurement	• Assumption that water charges will reflect all the extra monitoring required by NRAR – could reduce this by reducing the amount of data collected (i.e. outside of FPH event) • If a storage only fills 1 year in 10 – then a storage device isn't cost effective.	Whilst these points are valid, and highly pronounced during this current period of drought and accelerated instrumentation of all water sources, the relative cost of measurement even for a small FPH licence is considered minor (refer Section 5.3). The cost of measurement may be mitigated as part of implementation with an extension to the timeframe and the use of subsidies and assistance as detailed below.
Use of gauge boards for storage measurement	• Could be a useful interim measure and backup in event of device failure.	Gauge boards are cheap, useful and reliable means of assessing storage volume, particularly as an interim measure and subsequently as a backup to later installation of electronic measurement.

		This can be achieved quickly whilst storages are predominantly empty, at low cost, sending a clear message that FPH take is being measured, the Department is "getting on with it", a stepping stone to formal, continuous, electronic measurement and supporting local economies in drought.
Storage curve and benchmarks	• The full supply level of the storage curve needs to reflect reality – storages controlled by a bywash should have FSL set to the bywash level. What about water captured above FSL in closed storages (i.e. water captured into the freeboard volume)?	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
Alternative measurement	• Should have choice/flexibility to measure at the point of take or storage, particularly where there are clearly defined points where FPH is brought into the farm – by agreement with landholder and NRAR • Below-ground lagoon storages subject to uncontrolled fill by FPH may be best measured at the pumps (point of take measurement) • Why is measurement at the storage non-negotiable? We want to be able to measure at the point of take (common in lower Macquarie) • Point of take measurement in some cases may be more cost efficient than multiple storages/cells • Lower Macquarie is subject to flood mitigation practices from Burrendong, meaning that there could be a flood duration of four months, whereby FPH could be taken from the floodplain and diverted around the storage. Won't be measured in current strategy but would be if measured at point of take • Tailwater from irrigation can occur whilst an FPH event is on. Therefore, the point of take measurement is more appropriate to simplify the accounting.	The option of measurement at the point of take may be favoured in some circumstances. The primary implication is that any developed area rainfall runoff during a nominated FPH event would not be counted as FPH. Few properties are likely / able to adopt point of take measurement therefore the volume of developed area FPH rainfall runoff unaccounted for is small; however, losses downstream of the measurement point (transmission and storage wet-up losses) are debited to the landholders account which offsets this. Point of take measurement will address the risk of unaccounted FPH take diverted directly to irrigation, which can be a significant volume in long flood events in the lower Macquarie Valley.
Telemetry / data security	• This monitoring at the storage should only occur during a floodplain harvesting event for data security. Why does NRAR need to see the data outside of these periods? • Why does NRAR continually need to monitor the storage level? The cost benefit of having continual storage measurement is not there • Splitting of telemetry favoured – landholder to receive data in real-time as well as NRAR for independent review and verification • Data security is very important – don't want it getting into the wrong hands and misused • Should be able to mothball the storage meter when its not in use • Data from storage devices not really valued to assist farm operations.	Landholders own the data being collected and should be allowed to access it in real-time. Data security is a key concern and the Department needs to communicate how this is being addressed. Electronic equipment in the field is prone to failure, poor mobile coverage and maintenance cost concerns are valid. Telemetry systems can likely be configured to go dormant during periods when the storage is empty, saving costs on transmission of meaningless data. The adoption of manual data collection by NRAR staff is not cost-effective. This feedback is valid however is an overreaction to frustrations with surface water metering telemetry that can otherwise be resolved technically. Telemetry for water meters in southern irrigation districts such as the Murray or Murrumbidgee Irrigation Districts, is operated and maintained by the governing water authority with costs recovered in water charges. The initial capital cost of the meter and telemetry unit is paid for by the user. The issues surrounding telemetry (indeed many other implementation, cost, equipment suitability and maintenance issues) can be more easily resolved via a central management authority for the FPH measurement device fleet with costs recovered from participating landholders. This approach has several key advantages: • Centralised and formal asset management approach with consistent utilisation of uniform equipment • Ability to establish a purpose-built telemetry network to avoid mobile coverage issues, or otherwise influence establishment of new mobile service towers by virtue of organisation size • Continuous IP and skills development in use and maintenance of technology in a relatively new setting • Optimisation of costs through economy of scale • Maintenance of central inventory for equipment repair and replacement.
Unaccounted FPH	• Perhaps specific to lower Macquarie valley – irrigation inside the levee whilst FPH event going on outside. FPH can be taken and bypass the storage, sometimes for months on end (especially in flood mitigation events from Burrendong Dam). FPH take in these times can often be direct to irrigation meaning it is not measured at the storage.	Properties that have a high risk of this occurring, as prevalent in the Macquarie valley, should install point of take measurement, and a pathway to allow this should be developed.
Accounting		
	• Rainfall runoff from undeveloped areas is subject to harvestable right provisions and some capture is permitted as non-FPH • Passive filled storages should allow account to go into debit in order to avoid breaching licence volumes • Can you utilise FPH licence to transfer water to non-FPH infrastructure? • iWAS – needs more flexibility for accounting notes/deductions with an embedded calculator.	Guidelines for accounting are required to provide landholders with clarity on allowable deductions. These guidelines could be incorporated into the iWAS reporting system in order to simplify the process. Further clarification is required on the status of BLR water, the take of supplementary water and the ability to transfer between storages, as it pertains to accounting for FPH take, particularly when concurrent.

	• Accounting needs flexibility in the measurement to account for dam failure and loss of water returning to the floodplain • Query – is the five-year accounting locked in? Or what is the arrangement for multi-year accounting?	Participants are unaware of the Department's position on multi-year accounting and account debit provisions (if any).
Temporary storages		
	• Define temporary storage – suggest one month or more is temporary storage. Less time than this is a surge area awaiting pumping to storage • Temporary storages (i.e. field) are not common. Remove from FPH equation. Losses in temporary storage would have been sustained anyway if the area could flood in its natural condition and is probably a small volume of take anyway.	Any structure that stores water should be measured, with clarification on the difference between a surge area and a storage.
Implementation		
Approach to implementation	• No specific feedback.	Nil.
Timeframe	• Suggest that the timeframe to implementation is 12 months from receipt of formal entitlement.	Landholders are concerned that the timeframes are tight and that any delays in implementation only serve to reduce the available time for them to deliver on their obligations. The process and timeframe of implementation should be communicated to landholders with tasks expedited, if possible, in order to give enough time for landholders to become compliant.
Equipment specification	• Meters that don't meet the specification set down by the Department may not be that far short in accuracy so why would a landholder be required to replace them? Can the grandfathering provisions be extended to save landholder cost?	The minimum requirements for electronic equipment need to be clearly communicated to the industry to review and comment and ultimately allow for the market to respond.
Market capacity	• No specific feedback.	Nil.
Departmental assistance	• Department to prepare interim position regarding storage curve development, benchmarks and installation of gauge boards to ensure short-term compliance.	An interim approach to measurement, using gauge boards, is an effective method of progressive implementation and to introduce landholders to storage measurement.
Data availability	• Dept needs to issue storage curves as soon as possible so landholder can verify. Need a process to challenge determined storage curves and FSL volume	The questions regarding storage curve accuracy can be resolved by providing landholders with opportunity to review and challenge/update curves using better information, if available.
Other issues		
FPH Works Infrastructure Plans (WIP)	• Irrigator Behaviour Questionnaires requested in 2014/15 – is more information needed in order to prepare WIPs? The use of 3-5 year production yields for FPH evidence would be beneficial. Frustration that process has taken 20 years to date and still not yet formalised. • Ground truthing – how can this happen to confirm the WIPs? • Confirm if farm development post 08 is ineligible from WIP and modelling? • More communication of the WIP process/form/documentation is required • Question – if works post 2008 are not nominated as FPH works then is measurement not required?	The incomplete nature of the WIP process is causing much concern and frustration, given that WIPs are the basis for the determination of the licence volume. There is confusion around the issue of works constructed post-2008 and how these are addressed in the modelling. There is a clear need for more communication of the process of WIP development and for acceleration to completion. This process needs to provide for landholder review and verification of WIPs to instil confidence in the modelling that underpins the licence to be issued.
Entitlement determination	• Query over whether a temporary storage was there pre-08 and more efficient storage constructed post-08 – the construction of the storage is more efficient so will it be included in the modelling for FPH? The drive for better efficiency results in a better outcome yet may be excluded from the model • Landholders need to know what the entitlement volume is in order to better understand the implications of measurement and how best to implement • Trading of FPH licences permanently or temporarily is desirable. • Landholders want to know their entitlement volume and how it was determined. They are requesting the ability to challenge this determination if needs be – if given a licence that reflects historical use then this will satisfy however there is a lot of conjecture over the accuracy of modelling.	There is significant concern surrounding the accuracy of entitlement volume determination given it is not yet complete. This process needs to be accelerated and brought to completion as a necessary pre-requisite to the application of the Strategy. Trading of FPH licences is intended to be made available in time however this complexity is not being addressed in the initial rollout of the Strategy.
General comments	• Why are some valleys well informed / well progressed with reference to WIPs, entitlements, process and Macquarie isn't?	There is perceived disparity between progress toward WIPs and entitlement and this can be rectified with clearer communication of program progress at the valley-scale and acceleration of completion.
FPH taken into private irrigation water supply schemes	• Irrigation water supply schemes (private) in lower Macquarie take FPH through below ground channels. How to divide up the take of FPH internally? The inlet channels are not monitored / measured and some scheme members are not on the floodplain and may not receive a FPH entitlement.	The take of FPH water into water supply schemes is not specifically addressed in the Strategy. Clarity is required on this for scheme operators and members to be able to respond.

	• Scheme may deliver to non-FPH farms. Should the scheme apply for a FPH licence on behalf of members? Does every storage on the scheme require measurement?		
Strategy objectives	**Metric**	**Guidance on how to measure**	**Feedback – does the Strategy achieve the objective?**
Measurement methods	• Practical	• Balance between implementation and on-going effort • Robust framework for application	• No – as there is no ability to utilise alternative measurement points, such as measurement at the point of take. Strategy would be more practical if this option was provided. Draft Strategy is certainly more workable than previous versions.
	• Cost-effective	• Cost of implementation • Equity / fairness	• Cannot determine if the Strategy is cost-effective until licenced entitlement is known. The FPH licence may be small, threatening farm viability, and therefore measurement cost is a significant concern. However, the cost of metering/cost of water itself is insignificant if the licence reflects historical use.
	• Safe implementation	• Qualified persons to install metering	• No concerns.
Data quality	• Integrity of data	• Accurate, reliable and tamper proof	• Data security an issue. Data should not be retained after a certain period, say five years to reflect the multi-year accounting. • NRAR attitude – metering is required but no verification or ability to challenge their determination.
	• Informs farming decisions	• Data to / from farm (telemetry) • Is the data useful for farm management	• Yes, but only if landholder receives data in real time on a separate feed to NRAR.
	• Landholder calculations	• Data needs qualification for movements in storage level	• As above.
	• Program evaluation	• Aims to measure more than 90% of FPH take	• 90% is a good balance between complexity, cost of measurement and accuracy.
Data quantity	• Identification of triggers for compliance	• Withstand public scrutiny • Continuous calibration of data sets	• The Strategy will help with public scrutiny, but its useless without the FPH licence.