



HUNTER VALLEY FLOOD MITIGATION SCHEME EVALUATION REPORT

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Planning and Environment**

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Cover image: Paterson River
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Clear Horizon

Contact Details

Clear Horizon Contact	Client Contact
Dr Francesco Gimelli	Adrian Milne
Senior Consultant	Project Officer
Clear Horizon Consulting	Department of Planning and Environment
132B Gwynne St, Cremorne VIC 3121	Awabakal Country, 6 Stewart Avenue, Newcastle 2300
Telephone: (03) 9425 7777	P: 0436 692 003
E: francesco@clearhorizon.com.au	E: adrian.milne@environment.nsw.gov.au

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Lead author/evaluator	Dr Francesco Gimelli
Project Director	Dr Don Thomson
Internal Contributors	Ed Hawkes
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Contents

Executive Summary	5
Introduction	5
This evaluation	5
Key findings	6
Conclusion.....	7
Recommendations	7
1 Introduction	8
1.1 The scheme and program	8
1.2 This evaluation	9
2 Findings	11
2.1 Introduction	11
2.2 KEQ 1: To what extent have the scheme assets reduced risk to infrastructure, property and lives?	11
2.3 KEQ 2: To what extent has the program improved or maintained environmental outcomes since July 2017?	16
2.4 KEQ 3: To what extent has the program contributed to Aboriginal cultural and heritage values?	18
2.5 KEQ 4: How well were the stakeholders engaged?.....	20
2.6 KEQ 5: To what extent was the program implemented as planned? What are the lessons about program delivery and governance for future arrangements?	24
2.7 KEQ 6: To what extent was the program value for money?.....	26
3 Conclusion	28
4 Recommendations	29
4.1 Introduction	29
4.2 Recommendations	29
5 Appendix 1 – Document register	32
6 Appendix 2 – Data collection tools	37

List of figures

Figure 1. Perceived level of protection from scheme to property and assets, and person	13
Figure 2. Perceived level of protection from scheme, by location	13
Figure 3. How respondents to the community survey received information about the scheme (Community survey).....	20
Figure 4. Average Annual Damages (AAD) of buildings (all types) with the scheme in comparison to without by AEP event (DOC118).....	26

List of tables

Table 1. Data sources for evaluation	10
Table 2. Capital investment in scheme assets (excluding 2015/16 and 2016/17) [DOC139].....	14
Table 3. Extent to which respondents to community survey found the sources of information about the scheme appropriate for them	21
Table 4. Customer inquiries recorded in the Customer Enquiry Register, July 2017 - June 2021 [DOC136].....	23

Acronyms

CCF	Climate Change Fund
COVID	Coronavirus Disease
CSES	Community and Stakeholder Engagement Survey
DPE	Department of Planning and Environment
HART	Hunter Aboriginal Riverkeeper Team
HVFMS	Hunter Valley Flood Mitigation Scheme
KEQ	Key evaluation question
LALC	Local Aboriginal Land Council
LLS	Local Land Services
RMS	Roads and Maritime Services
RFQ	Request for Quotation
SAP	Systems, Applications and Products
SES	State Emergency Services
WAMC	Water Administration Ministerial Corporation

Executive Summary

Introduction

This report presents the outcomes of an evaluation of the Hunter Valley Flood Mitigation Scheme (HVFMS) program (the program) for the period July 2017 to the time of finalisation of this report. Broadly speaking, the scheme refers to flood mitigation infrastructure, while the program refers to the work of DPE-Water to maintain the scheme and any other activities aligned with the goals of the scheme.

1955 Year the Scheme was commenced	\$862m Value of Scheme assets (2005)	661,861 Population of Hunter Region (2020)	2000+ Number of Scheme assets
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This evaluation

The purpose of this evaluation was to assess:

- the infrastructure, environmental and social **outcomes** of the program
- the scheme's overall **value for money**
- the program's overall **performance**, including that of the program team.

These dimensions were assessed by seeking answers to six key evaluation questions (KEQs):

1. To what extent have the scheme assets reduced risk to infrastructure, property and lives?
2. To what extent has the program improved or maintained environmental outcomes since July 2017?
3. To what extent has the program contributed to Aboriginal cultural and heritage values?
4. How well were the stakeholders engaged?
5. To what extent was the program implemented as planned? What are the lessons about program delivery and governance for future arrangements?
6. To what extent was the program value for money?

The above KEQs guided data collection for this evaluation, which comprised:

- a community survey of 642 residents, including 205 landholders with scheme assets on their land
- twelve in-depth, individual, semi-structured interviews with program staff, delivery partners and councils
- in-depth review of 136 scheme and program documents.

Key findings

KEQ	Finding
<p>1. To what extent have the scheme assets reduced risk to infrastructure, property and lives? (Section 3.1 of this report)</p>	<p>Scheme assets have reduced risks to infrastructure, property and lives to a high degree, for floods of low to moderate severity, as per the scheme's design. The program provides multiple benefits including flood mitigation, environmental and social benefits. "Without the HVFMS in place, many areas of the floodplain would be regularly inundated to low levels every one to two years" [DOC001, p52].</p> <p>The program of asset management, replacement and maintenance is generally very effective in maintaining the flood mitigation role of the scheme. The effectiveness of the program has been demonstrated in recent flood events, during which the asset performed in accordance with its design.</p> <p>The shift towards a risk-based approach to asset management has resulted in timely management responses that are commensurate with need, and works are timely and efficient. However, greater capital investment in scheme assets may be required due to under-investment over the past two decades as many assets are reaching the end of their lifespan.</p>
<p>2. To what extent has the program improved or maintained environmental outcomes since July 2017? (Section 3.2 of this report)</p>	<p>The program has improved environmental outcomes since 2017. This has been achieved through restoration work the Upper Hunter region and the consistent implementation of Environmental Management Plans in the Lower and Upper Hunter regions.</p>
<p>3. To what extent has the program contributed to Aboriginal cultural and heritage values? (Section 3.3 of this report)</p>	<p>The program recognises that it is working in a landscape with a rich Aboriginal heritage and consistently seeks to contribute to Aboriginal cultural and heritage values. Aboriginal Cultural Heritage assessments are undertaken on all works within 250 metres of the river to ensure that works do not breach the National Parks and Wildlife (NPW) Act (1974). Since 2017, such assessments have led to the identification of locally significant sites and artefacts. The Hunter Aboriginal Riverkeeper Team (HART) program also helps to foster participants' connection to country and provides them with training in identifying, assessing and preserving heritage sites.</p>
<p>4. How well were the stakeholders engaged? (Section 3.4 of this report)</p>	<p>Stakeholders are engaged well by the program team considering their limited expertise in, and capacity for, stakeholder engagement. Landholders, councils, and Aboriginal stakeholders are all engaged to varied extents. Landholders with assets on their land are engaged by the program through diverse means and found information about the scheme accessible. Councils are engaged well at a programmatic level (i.e., around works and flood response), but not engaged well on issues relating to development on floodplains. Aboriginal stakeholders are engaged well through HART, Aboriginal cultural assessments, and other initiatives aimed at understanding and documenting the region's rich Aboriginal heritage.</p>
<p>5. To what extent was the program implemented as planned? What are the lessons about program delivery and governance for future arrangements? (Section 3.5 of this report)</p>	<p>There has been significant improvements in the management of the scheme during the period 2017-2021. The shift towards a risk-based management approach means that works schedules are less prescriptive but therefore more efficient and responsive to assessed need. All interviewees reported that the asset assessment process and works programs are undertaken in a comprehensive and timely manner. There is high consistency between planned and delivered program outputs.</p>

KEQ	Finding
6. To what extent was the program value for money? (Section 3.6 of this report)	The program has a cost-benefit ratio of 1.9:1; for every \$1 invested in the scheme it provided \$1.90 in benefits. The scheme produced net annual benefit of \$7.1 million (\$15.0 million in annual benefits and cost \$7.8 million to maintain). From a cost-benefit perspective, this represents good value for money and returns broader non-economic benefits (environmental, health and wellbeing) to the regional community.

Conclusion

The scheme, and the program that supports it, provide a wide range of flood mitigation, economic, social and environmental benefits to the Hunter Valley and is therefore highly relevant to the region. Over its long history, the scheme has primarily achieved this by focusing on the maintenance of scheme assets. Since 2017, a significant shift towards a more comprehensive and effective risk-based asset management plan has significantly improved the effectiveness of the program's management of the scheme. Notwithstanding that progress, the scheme faces challenges in the near and distant future. The recent (2020) Hydraulic and Cost-Benefit Assessment of the Impact of Climate Change on the Scheme (the Scheme Review) highlighted the changing profile of the region, the changing needs of the community, and the likely impacts of a changing climate. These changes mean that the scheme and program will need to adopt more holistic approach to flood mitigation that builds community resilience through effective stakeholder engagement and ecological restoration alongside its traditional asset management activities. Although this shift is substantial, this evaluation found that the program and its team are in a strong position to successfully execute this pivot. The program has upskilled staff's capacity and training in stakeholder engagement and implemented enhanced systems and processes to this end. However, there is scope for the program to further enhance its capacity and professionalism in stakeholder engagement and thus facilitate the shift called by the Scheme Review.

Nevertheless, asset management will remain an important part of the scheme's activities. On this front, there has been very little capital investment in the scheme for 20 years and many of the assets are nearing the end of their lifespan; there is a need for capital investment to maintain both larger- and smaller-scale scheme assets to ensure these can be replaced as they reach the end of their service-life.

Recommendations

Six recommendations are made, mainly relating to how the program could further enhance its stakeholder engagement capacity to progress towards implementation of the Scheme Review. For detailed recommendations please refer to Section 5 of this report.

1. Consider ways to further strengthen the program team's stakeholder engagement expertise.
2. Enhance the provision of information about the scheme to the community.
3. Strengthen collaboration between program, relevant agencies and local councils to build greater community resilience to flooding
4. Plan for and fund the shift towards a more holistic flood management approach
5. Build organisational structures and processes for the program to work with councils and landholders on the restoration of ecological entities.
6. Quantify the amount of capital investment required for effective management of both larger and smaller scheme assets.

1 Introduction

This report presents the findings of this evaluation of the Hunter Valley Flood Mitigation Scheme (HVMFS; the scheme) program (the program). This report is structured in the following way:

- Executive summary
- Introduction (this section)
- Findings
- Conclusion
- Recommendations
- Appendices, including data collection tools

1.1 The scheme and program

This evaluation distinguishes between:

- **The scheme:** flood protection and mitigation infrastructure that has existed and expanded since 1955.
- **The program:** activities conducted by DPE-Water to maintain and augment the scheme infrastructure and deliver other activities aligned with the goals of the scheme. The 'program' being evaluated is the 5-year tranche of funding from the Climate Change Fund (CCF) from 2017/18 to 2021/22 (\$21M from the CCF and c.\$10M from Hunter Local Land Services [HLLS]).

The scheme is comprised of flood mitigation infrastructure to protect life and property across the Lower and Upper Hunter Valley in NSW. The Upper Hunter works are primarily streambank stabilisation works. Most of the Lower Hunter works are integrated structural assets including levees, spillways, drainage channels and floodgates. The scheme was built following 1955 and comprises 184kms of levees and a 164km network of drains. The assets in the scheme were valued at \$862 million dollars in 2005, the latest date for which a figure is available.

The program refers to the activities conducted by DPE-Water to maintain and augment the scheme infrastructure and deliver other activities in line with the goals of the scheme. Since 2017 these activities have comprised two streams of work:

- Care and maintenance of the scheme (areas 1 – 14)
- **Riverbank works in the Upper Hunter area** ('area 15'). This relates to several sites where riverbank stabilisation works were undertaken in the past, and a proportion of these sites have now fallen into disrepair and represent an environmental, infrastructure and/or public safety hazard. The works include securing the site, removal or stabilising the hazard and revegetating the site.
 - **The Hunter Aboriginal Riverkeeper Team** (HART) project is one element of this stream, which aims to engage Aboriginal and Torres Strait Islander people to undertake environmental, heritage management and land conservation works. The project provides collaborative training and employment programs for staff to undertake these works. The project is an initiative of Local Land Services' (LLS) Innovate Reconciliation Action Plan 2018.

The program is led by a DPE-Water team comprising 7 staff, with \$30 million total funding over that period. LLS and local councils contribute 25% of the scheme maintenance costs through ratepayer contributions, as required under the Water Management Act (2000).

1.2 This evaluation

Purpose

The purpose of this evaluation was to assess:

- the infrastructure, environmental and social **outcomes** of the program
- the scheme's overall **value for money**
- the program's overall **performance**, including that of the team.

This evaluation provides an evidence base to inform the development of the scheme into the future and inform the program's evaluation and reporting processes. This evaluation is intended to inform the next two phases of the program (22/23 – 25/26 and 26/27 – 29/30).

Last, this evaluation investigated community perceptions and awareness of flood risks and explored their implications for **community resilience to flooding**.

Scope

This evaluation considered program activities and, in turn, outcomes from the scheme itself over the five-year CCF funding period between July 2017 and June 2022.

The following areas are outside the scope of this evaluation:

- scheme infrastructure managed by other authorities, specifically the Denman levee which is the responsibility of Muswellbrook Council
- flood mitigation and drainage infrastructure in the region that is not owned by the NSW Government
- other flood management initiatives such as council flood risk management plans or State Emergency Services responses to flood.

Key evaluation questions

This report aims to address all six key evaluation questions (KEQs) below. These questions were used to guide the collection and analysis of data

7. To what extent have the scheme assets reduced risk to infrastructure, property and lives?
8. To what extent has the program improved or maintained environmental outcomes since July 2017?
9. To what extent has the program contributed to protection of Aboriginal cultural and heritage values?
10. How well were the stakeholders engaged?
11. To what extent was the program implemented as planned? What are the lessons about program delivery and governance for future arrangements?
12. To what extent was the program value for money?

Data collection and analysis

The evaluation used a theory-driven approach to develop evidence-based findings against the KEQs. The approach was underpinned by mixed methods, capturing qualitative and quantitative data to triangulate evidence and strengthen the rigour of the findings.

Data was collected through a desktop review, a survey of floodplain communities, and interviews with stakeholder groups. Table 1 shows a summary of data collected from each stakeholder group for this evaluation.

The data collected from the desktop review, surveys and interviews was analysed separately using the following approaches:

- **Qualitative data** was analysed using thematic analysis, where comments that touched on similar topics were themed to give an indication of how many individuals had similar opinions about a topic. Individual comments that were considered significant were also captured.
- **Quantitative data** from surveys were analysed using descriptive statistics presented in graphs and tables.
- All evidence was synthesised against the KEQs and a **results workshop** was held with the program team to collaboratively review the evidence and review the key findings. A results pack was used to synthesise the evidence against each KEQ.

Table 1. Data sources for evaluation

Stakeholder group	Stakeholder	Respondents
Documentation	NA	136 documents were reviewed (see Appendix 1)
Program staff	Program Team	5
	Climate Change Fund	1
Delivery partners	Hunter Local Land Services	1
	Contractors and suppliers	2
	Other delivery partners (e.g., SES)	2
Community	Councils (inc. Joint Organisation)	1
	Community	642 survey responses, including 205 with assets on their land

Limitations

While every effort was made to ensure a rigorous evaluation within the budget available, we note the following limitations of the methodology:

- The views cited are not representative of all stakeholders. The evaluation used targeted interviewing to ensure the inclusion of a balance and diversity of stakeholder perspectives. However, other stakeholders not engaged through the course of this evaluation may hold contrary views to those reflected in this report.

2 Findings

2.1 Introduction

The findings in this section are structured according to KEQ. An overall finding statement is presented for each KEQ (e.g., KEQ 1), followed by more in-depth analysis according to sub-KEQ (e.g., KEQ 1a). The more in-depth analysis includes presentation of the evidence upon which the findings are based, including whether the evidence is from 1) documentary sources, 2) interviews, or 3) the community survey.

In the case of documentary evidence, reference to the specific document is made (e.g., DOC01). Document codes are explained in the document register available in Appendix 1 – Document register. In the case of interviews, each interviewee was assigned a code. Codes correspond to the stakeholder group ('PT' for 'Program Team'; 'OS' for 'Other Stakeholders', including delivery partners; 'CO' for 'Council').

When reporting findings from interviews, the interviewee codes are provided in-text to indicate both the number of interviewees and the stakeholder group that provided the evidence referred to.

2.2 KEQ 1: To what extent have the scheme assets reduced risk to infrastructure, property and lives?

Before presenting the findings relating to this KEQ, it is important to distinguish two broad areas that the findings here relate to. These are:

1. **The technical aspect of the program:** this refers to the infrastructure services that the program delivers, which are intended to provide protection from flooding
2. **Community perceptions of the program:** these are around the perceived level of benefit they derive from the scheme.

Overall Findings

Scheme assets have reduced risks to infrastructure, property and lives to a high degree, for floods of low to moderate severity, as per the scheme's design. "Without the HVFMS in place, many areas of the floodplain would be regularly inundated to low levels every one to two years"[DOC001, p52].

The program of asset management, replacement and maintenance is generally very effective in maintaining the flood mitigation role of the scheme. The effectiveness of the program has been demonstrated in recent flood events, during which the assets performed in accordance with their design.

The program provides multiple benefits including flood mitigation, environmental and social benefits. The program is therefore highly relevant to the region. In economic terms, it represents a very good investment for the NSW Government.

The shift towards a risk-based approach to asset management has resulted in timely management responses that are commensurate with need. Maintenance, repair and replacement of assets is based on risk assessments, engineering advice, assessment of environmental and cultural values and the availability of resources. Balancing these considerations ensures that works are timely and efficient.

However, greater capital investment in scheme assets is required due to under-investment over the past two decades as many assets are reaching the end of their lifespan.

The scheme successfully fulfils its core purpose to reduce risk to infrastructure, property, and lives. The Scheme Review [DOC01] found that the scheme assets reduce risks to property (primarily residential and primary production) \$8.3M average annual damages avoided, infrastructure (road and rail) \$1.3M average annual damages avoided, and the avoided disruption benefits community health and wellbeing (\$5.0M average annual damages avoided).

"The largest benefits accrue from the protection of buildings in residential areas and the associated health and wellbeing benefits. Protection of buildings in primary production areas of the floodplain is the third largest benefit. These benefits monetised here align with the purpose of the scheme; the scheme was designed to protect the townships and agricultural lands on the floodplain." [DOC118]

While the scheme broadly reduces risk across the Hunter Valley floodplain, the reduction varies by location. The most protection is afforded to Maitland City, Port Stephens, Singleton Shire, and Upper Hunter to a lesser extent. This comes at a cost for the city of Newcastle, which has higher flood risk due to the scheme. Overall, these changes result in a net risk reduction across the floodplain [DOC01].

The scheme is designed to *mitigate* the impacts of flooding. All stakeholders interviewed thought that the scheme is meeting its design intent well under the current management systems and practices. Indeed, some program team and asset managers interviewed thought that the scheme is doing such a good job at mitigating flood impacts that the community may be becoming somewhat complacent about flooding [CO05].

"...my experience with landholders is that they're not focused on flood mitigation because the scheme is so effective. I think many of the people who reside in this area forget that it's there, or that it even has a function and so, you'll see things like earthworks, house pads, clearing, saying, "This should be doing this, because this is my land and I want it to be more productive," or something. Whereas, "No, this drain is on your property because it has a function in the scheme." I think that's one of the biggest issues is that the understanding of the importance of the scheme, which I guess is a result of an effective mitigation scheme because the people who it's supposed to protect forget about it." [OS05]

The community survey revealed that there are polarised perceptions about the level of protection the scheme offered them; 23% of respondents thought the scheme provided 'no protection' for their property and assets whilst 17% said their property and assets were 'highly protected'. When asked to reflect on the level of protection the scheme offered to their person, the same proportion (21%) of respondents perceived that they were 'highly protected' as those that thought that the scheme offered them 'no protection' (see Figure 1). This is partly due to the relative risk exposure of residents surveyed (i.e., some respondents are not likely to be directly affected by floods because of where they live) and individuals' perception of risk (e.g., residents who have lived in the area longer may have a better knowledge and understanding of flooding in the region and have a better understanding of risk vs new residents that have never experienced a flood). Figure 2 maps the responses to questions about perceived protection of persons, property and assets to locations across the floodplain; it highlights that respondents who think the scheme offers 'no protection' are generally located in the areas that are more flood prone, regardless of whether there are scheme assets in the area or not.

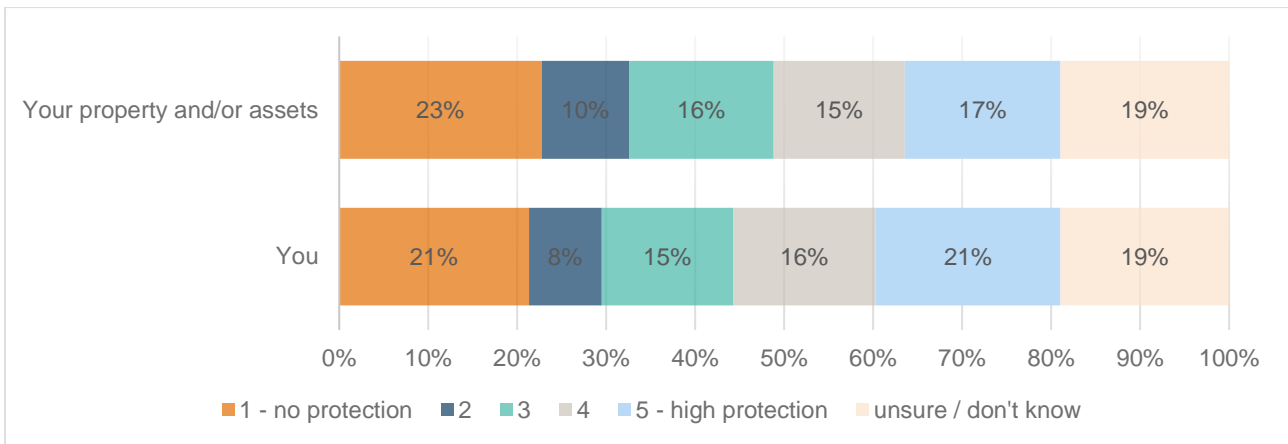


Figure 1. Perceived level of protection from scheme to property and assets, and person

Q6_1 ● 1 - no protection ● 2 ● 3 ● 4 ● 5 - high protection

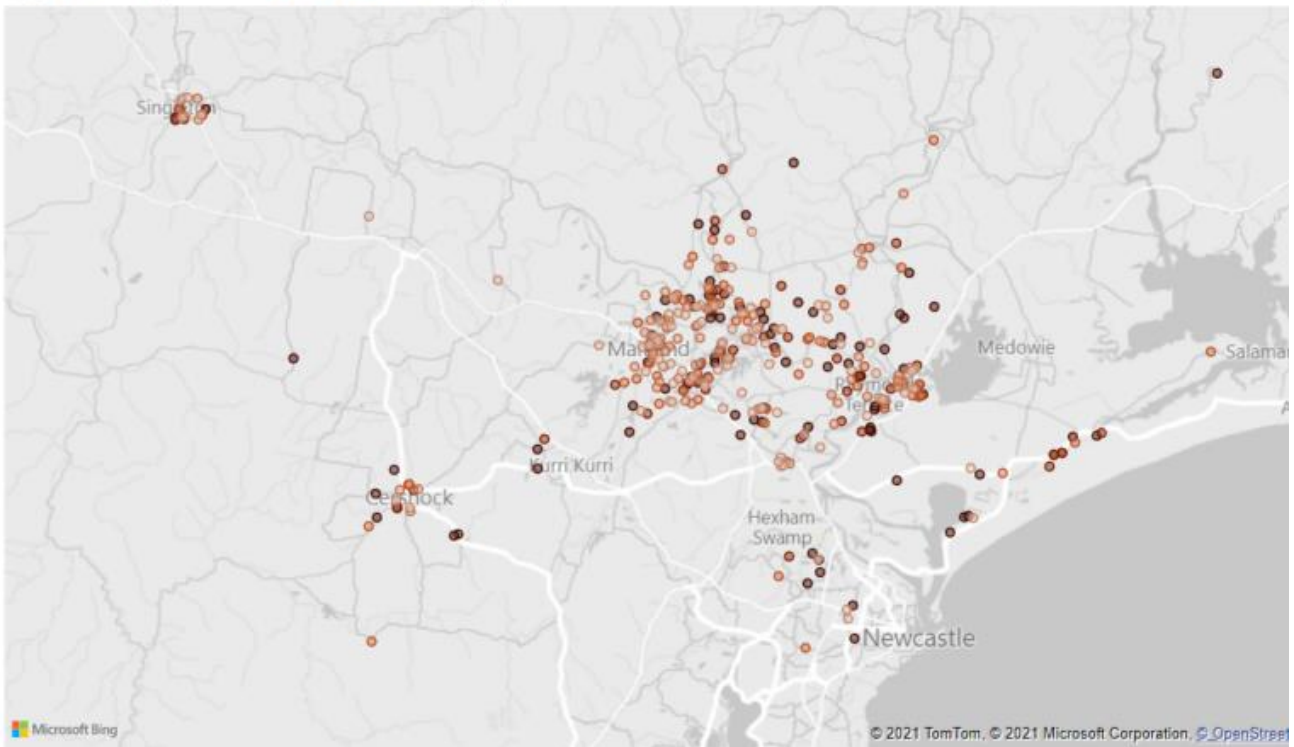


Figure 2. Perceived level of protection from scheme, by location

Effectiveness of program in maintaining flood mitigation asset integrity and decreasing potential damage cause by flood [KEQ 1a]

Asset management processes have been successfully established. This represents good progress since a 2015 audit which identified the lack of asset management plans and risk management [DOC18]. As recently as 2017 no asset management system existed for the scheme [DOC33]. Since then, considerable progress has been made and a logical asset management system and framework has been developed. This enables a baseline of understanding of the quality of existing assets and more effective oversight of scheme assets and risk management [DOC33]. Program Managers and delivery partners interviewed said that the shift towards a risk-based approach to asset management has improved the effectiveness and efficiency of the program.

“There wasn’t really an asset management system [prior to 2017]. We didn’t know where our defects were. We didn’t know what condition the assets were in. The compiling of asset condition reports and having that put into a logical framework, asset management system and framework, it’s allowed everyone to have oversight and to risk rate the assets and their condition to prioritise which ones need to be remediated.” [PT02]

The move towards the risk-based asset management system has also helped focus consultations with landholders. All Program Team and Delivery Partner interviewees reported that the program team and delivery partners are consulting landholders more regularly and purposefully to assess the condition of assets on their land and to map flood behaviour on their properties than they did prior to the asset management system being in place. This is due to a combination of the new processes and systems in place for stakeholder engagement and the greater emphasis on and appreciation of the importance of stakeholder engagement within the program (see Section 2.4 for more detail). Program team and delivery partners interviewed for this evaluation reported that incidences of asset failure have reduced over time and complaints from community/landholders have reduced as a result of the implementation of the asset management system [OS04, OS05, PT05].

“What I’ve seen is a reduction in the number of high-risk issues, even post flood, and ... anecdotally, a reduction in the number of complaints from landholders, which is a slightly different thing. It’s not really related to the risk on the scheme, but it was a number one driver for works and people complaining about something on their property and you go and fix it. But that’s reduced dramatically over the last five years” [OS05].

The program of asset management, replacement and maintenance is generally very effective in maintaining the flood mitigation role of the scheme. The effectiveness of the program has been demonstrated in recent flood events (March and November 2021), in which the asset performed in accordance with its design. However, Program Managers and delivery partners [PT01; PT02; PT03; OS04] reported that there are many legacy issues relating to the design and past management practices of the scheme which present challenges to current management in terms of resourcing. Particularly in respect of asset replacement. The majority of assets are in good or fair condition; however some floodgates are in very poor condition [DOC14].

“I think where improvements have been made in the last five years is that the scheme is assessed and then repair works and maintenance works are theoretically planned based on risk, which was what didn’t happen before. Putting the risk overlay has been the number one way of actually seeing tangible improvements there.” [OS05]

Greater capital investment in scheme assets is required considering the low investment over the past two decades and the reality that many assets are reaching the end of their expected lifetime. Table 2 shows that the program only renewed (replaced) approximately 2% of its assets in the 23 years from 1997 – 2020 [DOC139]. This is considered insufficient because many assets have a 50-year lifespan and most investment in the scheme took place between 1955 and 1970 [DOC01]. Program team members interviewed highlighted the urgent need for capital investment:

“The program has not had access to capital investment for 20 years, the assets are hitting their 50-year plus life, and they are in urgent need of replacement.” [PT01]

Table 2. Capital investment in scheme assets (excluding 2015/16 and 2016/17) [DOC139]

Total value of scheme assets (2005)	\$862 million
Total investment in asset renewal, 1997 - 2020	\$20.2 million
Renewal rate, 1997 - 2020	2%

Relevance of the program [KEQ 1b]

The program is relevant to the region because it provides a range of flood mitigation, environmental and social benefits. In economic terms, the program represents a good investment for the NSW Government, generating a positive return (Cost-Benefit Ratio of 1.9; see Section 2.7).

The program is also relevant for other reasons. It provides data on flood behaviour to the SES and other emergency responders, contributing to operational decisions of responders and thus to the protection of lives and property during floods [PT06]. The program also provides a range of environmental benefits to both the Upper and Lower Hunter regions, including by being the largest manager of aquatic and riparian weeds in the region (see Section 3.2). Last, the program also provides structures and processes to support stakeholder cooperation around flood and waterway management across the region [PT06].

Without the program, it is almost certain that many minor but crucial scheme assets would fail due to a lack of assessment and remediation [DOC01; PT01; PT06; PT04], although the severity of these failures is unclear [PT02]. Regardless of the severity of the failures, this would likely increase the damage from floods. If the program did not exist, landholders would likely implement their own flood mitigation works, shifting the problem on to other parts of the floodplain in an ad-hoc manner, potentially negatively impacting life, property and assets.

“[Without the program] there would have been a mass failure of a lot of the assets, just due to no maintenance in 2017, so obviously a lot of wear and tear after each flood event and just in general with all of the floodgates, etcetera, so it’s quite an ongoing process maintaining all of those. Without any maintenance works in 2017, most of the assets would have failed under the pressure of the flood.” [PT06]

Finally, it should be noted that the relevance of the program needs to be considered holistically in terms of the different roles the program team provides not only in asset management but also in terms of the expertise and knowledge that they provide to enable communities and emergency responders before, during and after floods.

Appropriateness of frequency of asset management and investment in the scheme [KEQ 1c]

Frequency of asset management varies according to the nature of the assets, their significance to scheme integrity, the outcomes of risk assessment processes, and benchmarking asset management activities [DOC17]. In general terms interviewees reported that the assessment and management of minor assets is frequent and timely (often because they can be assessed visually) and larger assets requiring more in-depth, detailed investigations are not being assessed and managed frequently enough [PT01; PT06]. This is primarily due to limitations in the level of investment available to fund detailed investigations of some of the more significant scheme assets. This has resulted in a backlog of asset replacement works.

Investment in scheme assets comes from two sources: NSW Government and from the Hunter Catchment Contribution. The scheme is insured against storm and flood damage with iCare. The program is currently processing an insurance claim for the March 2021 floods [DOC36,40,44,48]. Evidence about the adequacy of investment in the scheme is mixed; several interviewees [OS04; PT01; PT06; PT02; PT05] consider investment into the scheme as inadequate, particularly for the maintenance of larger assets. These interviewees thought that the scale of current funding only enabled a reactive approach to flooding, rather than the sort of more proactive approach called for in the scheme review that they consider essential to responding to the negative impacts of climate change.

“No, [funding is] not [adequate]. And I guess DPE-Water have identified budget shortfalls. They’re seeking [the NSW] Climate Change Fund to fund the scheme over multiple years and that’s identified a significant shortfall. In particular for areas 1 to 14, that aging infrastructure against the backdrop of climate change and sea level rise, yes, there is a shortfall.” [OS04]

Other interviewees, on the other hand, consider investment into the scheme to be adequate, particularly for day-to-day management [PT03; PT04; OS05; OS06].

“[Funding is] significantly more than what it was when I first started for the maintenance of the scheme. We’ve pretty well got it up to a generalised standard with the maintenance, but you’ve always got minor repairs which we’re now able to do, but it means that the bigger ones just get shoved back or wait for special funding or grants or anything to undertake the works.” [PT04]

2.3 KEQ 2: To what extent has the program improved or maintained environmental outcomes since July 2017?

Overall Findings

The program has improved environmental outcomes since 2017. This has been achieved through restoration work in the Upper Hunter region and the consistent implementation of Environmental Management Plans in the Lower and Upper Hunter regions.

The program contributes to the restoration of the environment in both the Lower and Upper Hunter regions. In both areas, the program helps manage aquatic and riparian weeds. The program also plants native vegetation as part of its riparian restoration works, increasing native vegetation cover and in so doing helping to restore river function, minimising erosion and sedimentation. This also improves water quality. In the Upper Hunter, the program has strong direct (on-site) and indirect (off-site) environmental outcomes in terms of geomorphic diversity, habitat, higher recovery potential, flood retention and mitigation and erosion control and sedimentation prevention.

The scheme has both positive and negative impacts on the environment. While this is inevitable because of the modifications that the scheme makes to the environment, program processes are guided by Environmental Management Plans that are actively and consistently used to minimise negative environmental impacts. In the Lower Hunter, environmental assessments have facilitated the identification of environmental issues (e.g., microbats and saltmarsh habitats) and the articulation and implementation of appropriate management actions.

Contribution to restoring the environment [KEQ 2a]

One of the key areas in which the scheme contributes to environmental outcomes is through the scheduled programs of riparian and aquatic weed management in the Upper and Lower Hunter. In the Lower Hunter, environmental impacts of asset management and replacement works are safeguarded through best-practice assessment and compliance processes [DOC123,126] [OS06; PT01; PT03; PT04; PT06]. Environmental assessments in the Lower Hunter are also identifying environmental (and cultural) values and this is enabling mitigation and management actions to be identified, designed and implemented (for example, microbats).

In the Upper Hunter, environmental outcomes are excellent in both direct (on-site) and indirect (off-site) terms [OS06]. Multiple outcomes are being achieved in terms of geomorphic diversity, habitat, higher recovery potential, flood retention and mitigation as well as the erosion-control and sedimentation prevention. This is partly the result of a move away from reliance on engineered solutions towards more holistic catchment and landscape-based solutions, which deliver multiple benefits for the environment.

The environmental management systems in place since 2017 [DOC123] are being consistently implemented and are consistent with best practice assessment and compliance processes.

Documentary evidence also indicates that the HART program contributes to the environmental works undertaken across the Upper Hunter in terms of weed control, revegetation and fencing as part of revegetation and riparian protection works. Revegetation works in the Upper Hunter were delivered to over 100 sites since July 2017, with monitoring being undertaken and reported within quarterly reports [DOC27-42].

“A riparian restoration project is only as good as its revegetation. The [program] make sure that that happens. They do a really good job at the long-term viability of the instream work. They do the revegetation and maintain the revegetation and come back. But the instream work is, “Okay. We’re here for four weeks and then we’re out,” whereas HART they’re there for two or three years’ planting, fencing, maintaining it and watering. They’re important there.” [OS06]

Works to improve habitat for fish (including installation of fish runs and other in-stream habitat restoration) are regular components environmental improvement programs in the Upper Hunter [DOC123]. Last, some progress being made towards restoring wetland functionality in Lower Hunter, though the Scheme Review calls for more needs to be done in this area (see also Section 3.5).

Contribution to minimising negative impacts on the environment [KEQ 2b]

Program managers and delivery partners reported that scheme works programs are consistent with Environmental Management Plans [PT01]. The outcome of this is that environmental impacts identified within the works planning stage and managed accordingly, minimising potential environmental impacts.

“[We] have environmental management plans that are reasonably consistent with the international standards for environmental management, and there have been a number of key projects that we’ve delivered in the Lower Hunter around environmental management.” [PT01]

Program managers and delivery partners consistently reported examples of how environmental assessment processes have identified values that could be impacted by scheme works and illustrated how these have been appropriately actioned (e.g., the identification of microbats living amongst scheme assets has triggered a conservation program).

2.4 KEQ 3: To what extent has the program contributed to Aboriginal cultural and heritage values?

Overall Findings

The program recognises that its activities are carried out in a landscape with a rich Aboriginal heritage and consistently seeks to contribute to the management of Aboriginal cultural and heritage values. Aboriginal Cultural Heritage assessments are undertaken on all works within 250 metres of the river to ensure that works do not breach the National Parks and Wildlife (NPW) Act (1974). Since 2017, such assessments have led to the identification of locally significant sites. The HART program also helps to foster participants' connection to country and provides them with training in identifying, assessing and preserving heritage sites.

This evaluation found that all program staff are aware of the Aboriginal heritage of the Hunter Valley and are committed to protecting this heritage in whatever ways they can [PT01; PT03].

Under the NPW Act (including the 2010 amendments), it is an offence to harm an Aboriginal object:

- Which the person knows is an offence (knowing offence). Maximum penalty \$550,000 for an individual and \$1.1 million for a corporation and a 2-year gaol term.
- Whether or not the person knows it is an Aboriginal object (strict liability offence). Maximum penalty \$110,000 for an individual, and \$220,000 for a corporation.

The program is managed consistently with this requirement. However, this evaluation found that the program team and delivery partners manifest a commitment to contributing to Aboriginal cultural and heritage values beyond this requirement. The program team pro-actively considers the Aboriginal heritage implications of the program and the scheme and formulate policies and practices aimed at safeguarding this heritage. Aboriginal Cultural Heritage assessments are built into the asset management process and are undertaken for all works within 250 metres of the river [DOC14; PT06; PT02].

"At any of the jobs that I've worked on, there's an Aboriginal Cultural Heritage assessment and a lot of them, if there's any artefacts or areas that could have potential artefacts of Aboriginal cultural heritage, assessments are carried out and there's strict controls in place for what kind of works and developments can go within a certain perimeter of where it finds and where cultural and spiritual significant artefacts have been found. It's pretty strict." [PT06]

These assessments seek to uncover and document any significant physical artefacts and local oral histories and are a requirement under the following legislation:

- Environmental Planning & Assessment Act 1979, Parts 3, 4 & 5
- National Parks & Wildlife Act, 1974 - Protection for known Aboriginal sites
- National Parks & Wildlife Amendment (Aboriginal Ownership) Act, 1996
- Aboriginal Land Rights Act, 1983
- Commonwealth Native Title Act, 1993
- Environmental Protection and Bio-Diversity Conservation Act, 1999
- OEH/NPWS Policy & Guidelines

Assessments undertaken by the program have led to the identification of locally significant sites and the collection of oral histories of flooding from local Aboriginal elders [DOC138; PT02].

In both the Lower and Upper Hunter, the program has been building the cultural awareness of staff and key partners such as Soil Conservation Service (SCS) through the HART program. The HART program is also building the capacity of local Indigenous residents in identifying, assessing and preserving heritage sites and seeks to do this by fostering the knowledge and skills required to do so and by fostering greater connection to Country [PT06; PT04]. This greater cultural awareness is contributing to making the overall program more sensitive to the Aboriginal history of the area.

The program works closely with Local Aboriginal Land Councils (LALCs) and the broader Aboriginal community through these assessments to identify the most appropriate ways to preserve cultural heritage. The result of this close work has been meaningful recognition from the local Aboriginal community of the positive work that the program is undertaking to identify and preserving Aboriginal cultural heritage, as indicated by the following statement from the Mindaribba LALC [DOC138]:

In November 2019, we requested [DPE] to support and assist us to conserve and preserve highly culturally significant sites and places. One of these places was the highly significant site complex at "Stradbroke", where hundreds of grinding grooves are located. As part of our request, we noted the vital need for further surveys and research to be undertaken along the watercourses.

By committing to undertaking this investigation, DPE acknowledged the value and significance of our sacred places. This investigation is part of a journey of healing, between Aboriginal People and government departments, that has started to mend our people and the stolen history of the Wonnarua, a story that is opening new doors for radical change to occur. Like the river system itself, we have had to wash clean a space where we allowed ourselves to enter a space of trust, a trust that has allowed our knowledge to be respected and for the Department to engage with Aboriginal People not only equally, but as leaders. [DOC138]

2.5 KEQ 4: How well were the stakeholders engaged?

Overall Finding

Stakeholders are engaged well by the program team considering their limited expertise in, and capacity for stakeholder engagement. Landholders, councils, and Aboriginal stakeholders are all engaged to varied extents. Landholders with assets on their land are engaged by the program through diverse means and found information about the scheme accessible. Councils are engaged well at a programmatic level (i.e., around works and flood response), but not engaged well on issues relating to development on floodplains. Aboriginal stakeholders are engaged well through HART and Aboriginal cultural assessments. Although there are some instances where the program team *consulted*, *involved* and *collaborated* with community stakeholders, the program primarily engages stakeholders by *informing* them – the lowest level of engagement in the IAP2 framework¹. This is largely due to resource, capacity limitations of the program, and limitations of the legal framework governing such engagements.

Appropriateness of information provided to stakeholders about the program [KEQ 4a]

The Community Survey found that most community stakeholders received information about the scheme through ‘other’ means (49%), with most of these indicating ‘other’ to mean by word-of-mouth. The next most common ways that respondents received information about the scheme were through annual letters to landholders (24%), media releases (22%), and through local council (14%) (Figure 3).

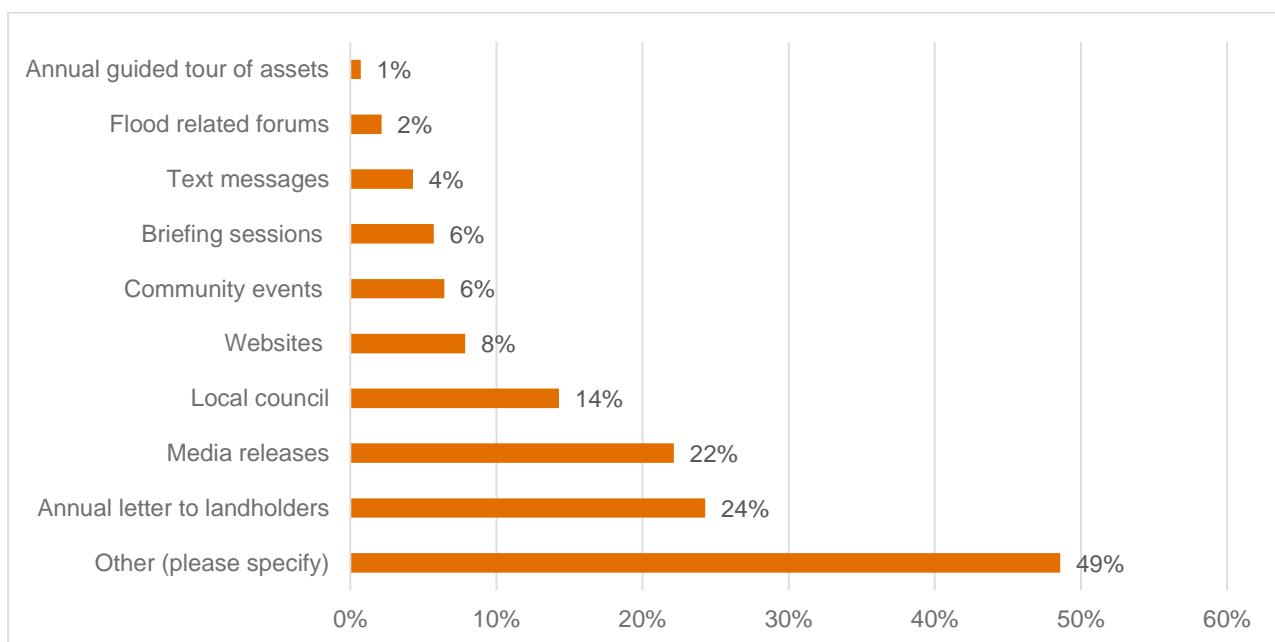


Figure 3. How respondents to the community survey received information about the scheme (Community survey)

This evaluation found that respondents considered these means of receiving information about the scheme appropriate (see Table 3). The only exceptions are briefing sessions (50%) and flood related forums (67%), though it should be noted that these methods only reached a small number of landholders. Overall, this finding indicates that the program is reaching most landholders through appropriate means; communication within the scheme is targeted well.

¹ https://iap2.org.au/wp-content/uploads/2020/01/2018_IAP2_Spectrum.pdf

Table 3. Extent to which respondents to community survey found the sources of information about the scheme appropriate for them

Method	Yes [appropriate]	n ²
Other (please specify)	82%	68
Annual letter to landholders	91%	34
Media releases	84%	31
Engagement through local council	95%	20
Websites	91%	11
Community events	100%	9
Briefing sessions	50%	8
Text messages	100%	6
Flood related forums	67%	3
Annual guided tour of assets	100%	1

Broader engagement with community

Community engagement is an essential component of programming works/management because scheme assets are predominantly on private land and landholder agreement is sought, even if it is not legally required for access to assets on private land. Whilst the program team play key roles in this aspect of community engagement and are widely perceived by interviewees to be doing this well, the interviews revealed that landholders tend to perceive the LLS and SCS as the 'go to' people for landholders because of their long history of engaging landholders; LLS and SCS are the organisations most easily recognised by the community, whereas there is a general lack of awareness of the names and functions of government departments in the region.

"In terms of the landholders' engagement, that's where Local Land Services kicks in.... Through that their responsibility is making sure that it's all good to get onto the property, and that takes a lot of work, not only in a sense that the landholder's comfortable coming to do the work in their river or take away five metres to fence it off and revegetate the floodplain, not only that congenial side but also contractually as well. The landholder isn't going to get all this work done if they don't commit to it as well, so there's a contract there. It's just called a landholder agreement, so the landholder has to sign it. LLS do all that, and we work with them and DPE works with them.... [name removed] from LLS will want to know what we're going to do so he can explain it to the farmer or the landholder. We're always working together, but at the end of the day he's the one that's saying, "Yeah, here's the green light to go onto their property. Here's the signed property agreement and here's the access. Here's what you can and can't do"...LLS have a massive role in stakeholder engagement." [OS06]

Across both the Upper and Lower Hunter, 59% of landholders surveyed were aware of the scheme. Unsurprisingly, this evaluation found that more landholders with assets on their land were aware of the scheme (89%) than those without assets on their land (58%). Engagement with Lower Hunter residents was lower than in the Upper Hunter: 26% of landholders surveyed in the Lower Hunter had received, seen or heard information about the scheme and flood risks since July 2017, compared to 40% of

² Number of responses.

residents in the Upper Hunter. Broader engagement with the community on the Lower Hunter floodplains is complex because of a general lack of awareness about the scheme (more specifically, who manages it), its purpose and the prevailing attitudes about flood management and the floodplain environment across the community.

Meeting the needs and priorities of Hunter Valley stakeholders [KEQ 4d]

Most delivery partner interviewees [CO05; OS04; OS06] said the scheme and the program are meeting the needs of communities on the floodplains in terms of flood mitigation and the protection of lives, property and other assets. However, this success may be contributing to complacency and lack of understanding about flood risks among residents, particularly under a changing climate.

The community survey revealed that the community are seeking:

- Better flood warning systems (including better mobile phone reception) and prediction of areas of inundation, road closure, etc.
- More information on where to go for assistance, who to call, etc.
- More information about plans for works associated with the scheme, on a regional basis (i.e., an understanding of the bigger picture).

Engagement of local Aboriginal communities [KEQ 4c]

The program engages Aboriginal people in efforts to preserve environmental and cultural heritage values, particularly in the Upper Hunter through the HART program. The program has also undertaken cultural awareness training for staff and Soil Conservation Service colleagues during 2018/19, in conjunction with Worimi LALC [DOC137]. Further evidence relevant to this theme is outlined in response to KEQ 3.2.

Engagement with councils

A comprehensive understanding of the program's engagement with councils within this evaluation was limited due to difficulties interviewing council staff. This was the result of program staff not readily being able to refer the evaluators to specific council staff (reportedly due to high staff turnover), a lack of response from council staff that were approached and complicated by the November 2021 floods which was a priority for program team and council staff to respond to.

Engagement with councils is currently low but is improving, including by more regularly informing councils about how the scheme operates and its relevance to them [PT04; PT06]. Most interviewees thought that local government are well engaged at a programmatic level (i.e., around works, flood response) but many interviewees said there could be improvements made in the way councils were engaged on issues relating to development on floodplains. The quality of engagement with councils is also somewhat uneven, with some councils being engaged better than others, though this is often due to factors internal to the councils (i.e., high staff turnover [PT06; PT02; PT03]) rather than because of any shortcomings on the part of the program team.

"Yeah, local government we do engage with. When I first started, you're like, 'Oh'. It was hard to track them down. We didn't. No one had contact details. It was a bit of a slog. We now do. We deal with them on a weed basis and a feral pest basis. Especially with [two councils]. When it comes to development within the floodplain, that's a whole other kettle of fish and I don't know if we're there yet with our communications. Obviously being different departments of the local government. On the enviro side we're pretty good. But, no, the other councils don't seem to

understand the scheme, and they don't seem to provide accurate or any information at all to other public members as to what the scheme does." [PT03]

The community survey found that the way in which the program engaged with landholders who have scheme assets on their land was mixed. Around half reported that they had been engaged by the scheme in some respect. Survey respondents reported that the information provided was accessible to them.

DPE workforce capability in stakeholder engagement [KEQ 4b]

A review of program documentation and interviews undertaken for this evaluation found that there has been no significant change in capacity for stakeholder engagement among the program team [DOC27-42], though the move from the Energy Environment and Science (EES) section to DPE-Water has provided the program with access to more substantial departmental resources for stakeholder engagement [PT01]. The program did not employ engagement specialists nor increase the resources allocated to community engagement [DOC27-42], except for one specialist who was engaged for six months to work on two project, the Wallalong Levee³ and Aberdeen Levee remediation works.

Interviews with the program team revealed confidence in their capacity to engage stakeholders, noting that they have implemented or are in the process of implementing a range of systems and processes to facilitate stakeholder engagement. The program uses a Customer Enquiry Register (CER) to manage and monitor community queries about the scheme and its management. The CER utilised a clear process map for managing customer inquiries and created a centralised database for recording relevant information including customer details, associated scheme assets and outcomes from the inquiry [DOC136]. Such tools have helped to facilitate contact with stakeholders. Table 4 shows the number and outcomes from customer inquiries logged during the program.

Table 4. Customer inquiries recorded in the Customer Enquiry Register, July 2017 - June 2021 [DOC136]

Customer inquiries	327
Inquiries which resulted in a site inspection	105
Site inspections which resulted in further action	24

In recognition of the usefulness of such tools, the program is adopting a new customer relationship management system (Borealis) as a requirement of the move from EES to DPE-Water. Borealis will add capacity in stakeholder engagement and improve efficiency [DOC42]. Some in the program team have also undertaken training in stakeholder engagement (i.e., IAP2), further enhancing the team's confidence in this area.

Whilst such training and systems have improved the team's capacity for stakeholder engagement, there is currently no expert/technical knowledge on stakeholder engagement within the team. The result is that, even with better tools for managing contacts, the team remains limited in its ability to engage stakeholders strategically and consistently. Nevertheless, most stakeholders interviewed for this evaluation thought that the program makes a concerted effort to engage stakeholders.

³ This finding is based on an interview undertaken as part of the evaluation of the Wallalong Levee remediation works community engagement activities.

2.6 KEQ 5: To what extent was the program implemented as planned? What are the lessons about program delivery and governance for future arrangements?

Overall Finding

There have been significant improvements in the management of the scheme during the period 2017-2021. The shift towards a risk-based management approach means that works schedules are less prescriptive but therefore more efficient and responsive to assessed need. All interviewees reported that the asset assessment process and works programs are undertaken in a comprehensive and timely manner. There is high consistency between planned and delivered program outputs.

Consistency between planned and delivered program outputs [KEQ 5a]

This evaluation found that the program was largely delivered as planned. The documentary evidence from quarterly LLS reports and fortnightly team meeting minutes indicated that delivery proceeded as planned at a high level [DOC27-42,45-109].

The Wallalong Levee remediation works project was an exception to this; the works started in 2015 and were not completed until early 2021. Significant unplanned time and resources were committed to engaging the community to remediate the Wallalong Levee.

The Wallalong Levee project highlighted gaps and challenges in program delivery and governance. Program delivery has adapted since this point in recognition of these challenges. These adaptations are identified below.

"[The systems were] completely inappropriate and inadequate. If I look at it from a systems point of view, we had basically doubled the budget on expenditure and there was no program planning around how that money was going to be spent, and certainly no broader engagement with the community, [not] even a letterbox drop." [PT01]

Extent of program delivery adaptation [KEQ 5b]

The shift towards a risk-based approach to scheme asset management has been the most significant adaptation in the program since July 2017 [DOC18,33]. This has been supported by a comprehensive scheme risk assessment, conducted in 2017.

"So, it became very evident from the start [when I joined the program in 2015] that there were some serious problems with the management of the scheme overall, in terms of how we were managing it... So, there was a multitude of issues. It wasn't being managed properly, we didn't have systems, we didn't have an asset management plan, we didn't have compliance protocols. It was a bit of an ad hoc way of managing it over a number of decades" [Wallalong evaluation report]

The program has devoted more resources and effort towards community engagement. The Customer Enquiry Register was first established in 2017 and the first formal stakeholder engagement strategy was developed in 2019 [DOC24,136]. Interviewees said that while this adaptation has been positive, it is still a work in progress.

"We've just got such a backlog of work with community and stakeholder engagement... It is much better than where it was. [In the past] we didn't even have a list of landholders, so we have that list and we've got people's phone numbers and they've been sent a couple of things in the mail now as well, so they know who to call. And that's been a big thing." [PT02]

Adaptation has been facilitated by the introduction of an Environmental Management System (EMS), which has resulted in a refinement to the way in which environmental and cultural heritage issues are managed through the program and has resulted in positive outcomes. The EMS has resulted in the identification of environmental and cultural values on and around assets. This has resulted in an adaptation of works programs and triggered other programs (e.g., the microbats program, which was initiated after the discovery of bats living in scheme assets) [DOC123,126].

Program staff and delivery partners with a longer history in the region reported a trend they had observed, in that after each flood, there has been a re-focusing of efforts towards building community resilience and preparedness for flooding.

Incorporation of recommendations from Scheme Review [KEQ 5c]

The recommendations of the Scheme Review are receiving attention but are not yet being implemented. However, it is noted that the recommendations of the Scheme Review require long-term planning so it is not unreasonable that at this stage in the current program, significant progress could not yet be expected to have been made. The fact that interviewees consistently reported that the recommendations of the Scheme Review are ‘front of mind’ for the program team and delivery partners is good evidence that progress towards adoption are likely to hasten in the next 5-year funding period. Program managers and delivery partners reported several reasons for the current state of progress, such as:

- More funding may be required to facilitate this shift more efficiently.
- Some in program managers feel that the shift requires greater collaboration with relevant agencies (e.g., councils and emergency responders), and that this means that the shift needs to be a collective effort, rather than a responsibility of the program alone.
- Broader community attitudes are not seen as conducive to messages around adaptation, ecological restoration and the potential implications for development restrictions on the floodplain.

The program team mainly comprise technical (engineering) and project management skills. This mix is appropriate for the program’s asset management responsibilities but is not necessarily appropriate to facilitate the shift towards more community engagement and wetland restoration work.

In the Upper Hunter in particular, building broader catchment/landscape resilience is being achieved through a more holistic approach using revegetation, fencing, and ‘softer’ engineering solutions to manage waterways and landscapes at scale.

Program alignment with principles of the Water Management Act (2000) [KEQ 5d]

The program aligns with the principles of the *Water Management Act 2000*. This is supported by the EMS and Asset Management Planning and assessment processes [DOC17,130,130].

All interviewees thought that the scheme’s management approaches aligned very well with the principles of the Water Management Act.

Delivery partners highlighted how well the HART program and the EMS are contributing significantly to improvements against the principle “geographical and other features of major cultural and spiritual heritage should be protected”.

The program was also designed to align to the *Energy and Utilities Act 1987*. This is articulated in the 2021 CCF business case for the program [DOC140]. Whilst the achievements of the program against the principles of this Act have not been specifically assessed in this evaluation, the program team’s own assessment is that the program meets the requirements of the *Energy and Utilities Act*.

Meeting NSW Government Asset Management Policy for the NSW Public Sector Treasury standard (TPP19-07) [KEQ 5e]

The program aligns with the Treasury standard. The program scores 72% on the NSW Asset Management Policy Assessment Tool and has an implementation plan to reach 100% by 2024 [DOC15].

2.7 KEQ 6: To what extent was the program value for money?

Overall Finding

From a cost-benefit perspective, the program represents good value for money and returns broader non-economic benefits (environmental, health and wellbeing) to the regional community. It should be noted that the cost-benefit analysis was undertaken for the scheme, rather than just the 5-year program.

Program cost-benefit ratio [KEQ 6a]

The scheme achieved a cost benefit ratio of 1.9:1, that is, for every \$1 invested in the scheme it provided \$1.90 in benefits. The scheme produced net annual benefit of \$7.1 million (\$15.0 million in annual benefits and cost \$7.8 million to maintain) [DOC01]. This is good value for money from an economic perspective.

The scheme provides benefits for different levels of flooding. Figure 4 shows that the scheme effectively reduces flood damage costs to building in all events except for the 5% Annual Exceedance Probability (AEP) and extremely large flood events (0.2% AEP and higher). The benefit is illustrated by the differences between the two adjacent columns.

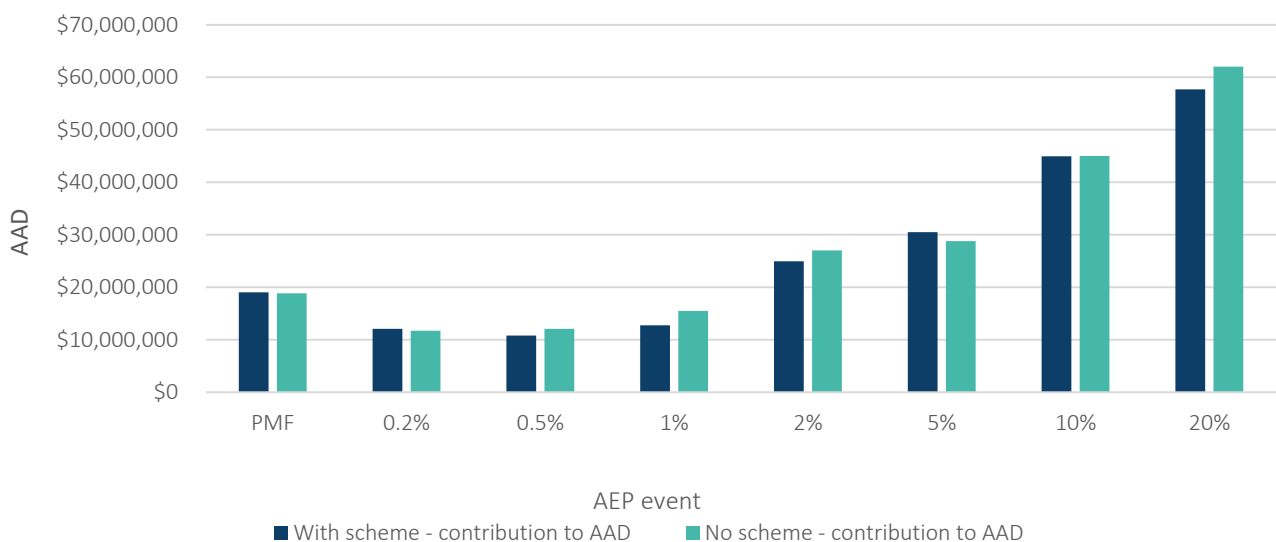


Figure 4. Average Annual Damages (AAD) of buildings (all types) with the scheme in comparison to without by AEP event (DOC118)

Application of cost-effective delivery mechanisms [KEQ 6b]

Overall, the scheme represents value for money in that it is being largely delivered efficiently. However, one area of the scheme that some of the project team think is not being delivered effectively is larger

projects; one program team member considering this a result of a diversion of resources and attention from management towards emergency response [PT03], while another interviewee thought this was because of a lack of training and expertise in construction management, project planning for larger, more complex projects and lack of experience in procuring construction services [PT01]. The same interviewee said that improvements are being made in these areas and continuously reviewing team structures to efficiently deliver all work streams.

In general, the program is being implemented cost-effectively and efficiently. Program managers and delivery partners report that maintenance works are undertaken very efficiently because of SCS's expertise and experience, their trusted relationships with key suppliers and contractors and their practical approach.

Program managers reported that the risk-based approach to asset management ensures resources are allocated efficiently. However, some delivery partners highlighted inefficiencies in contractual arrangements between DPE, LLS and SCS, resulting in lower value for money due to their structure and reporting requirements [OS04; OS05]. However, this perspective was not shared by the program team.

"The contractual arrangement between our two entities is grossly inefficient, and I've made that very clear over the years. We got to a point a few years ago where we just had a memorandum of understanding with agreed rates. I've tried to push them away from that onto a model where we could really track actual hours spent on, but it didn't fit the Systems Analysis Program (SAP) system, so in some ways, the structure of the schedules is built to fit SAP rather than the system fitting what the program should do if that makes sense." [OS05]

Some interviewees said that the SAP system seems to be dictating contractual structures and reporting requirements and this contributes to the contractual inefficiencies because of SAP's focus on financial reporting tool [OS05; OS06]. Others noted that SAP can be used to support effective programming of work orders and workflows. Nevertheless, there are broader whole-of-government projects which seek to improve workflow and scheduling within GIS based asset management system, which will likely resolve these perceived inefficiencies.

The evaluation found that the program adheres to the DPE procurement framework and project management systems. Maintenance works are undertaken very efficiently because of the SCS's expertise and experience, their trusted relationships with key suppliers and contractors and their practical approach.

Leveraging of external contributions [KEQ 6c]

The program is co-funded: 75% from DPE and 25% from LLS [DOC01]. Grants also have the same funding structure [DOC27-42]. HLLS provided significant in-kind support over the period from July 2017, as much as four full-time positions. HLLS also supported the program through joint governance arrangements, program planning assistance, delivery of works in the Upper Hunter, and project and community support in the Lower Hunter. Furthermore, since all of the scheme assets are on private land, there is a significant in-kind contribution to the scheme from landholders which is not currently accounted for and is therefore under-valued and under-recognised.

3 Conclusion

The HVFMS was designed almost 70 years ago to mitigate the risks and impacts of small to medium floods in the Hunter Valley through flood mitigation infrastructure typically located on private land. The scheme continues to fulfil this purpose effectively and efficiently, providing ongoing flood mitigation benefits to communities across the Lower and Upper Hunter regions.

Moreover, the program provides a range of positive outcomes beyond flood risk management. This includes diverse environmental outcomes; a range of economic benefits resulting from flood protection; positive social outcomes through opportunities for stakeholder engagement and collaboration and support provided to local Aboriginal communities in the form of the HART program, and the acknowledgment of the region's rich Aboriginal cultural heritage.

The scheme provides the people and environment of NSW with considerable value for money, generating \$1.9 of benefit for every \$1 spent.

While originally designed as an infrastructure project, the scheme and the program that supports its management are evolving to meet the changing profile of the region, the changing needs of the community and a changing climate. The recent scheme Review identified the inadequacy of mitigating flood risks through infrastructure alone in light of the likely impacts of climate change. The scheme Review has called for a shift towards a community resilience approach driven by deep and consistent stakeholder engagement and an emphasis on wetland restoration and management. The recommendations of the Scheme Review are yet to be formally endorsed by DPE. In the likely event that they will be, the program is in a strong preparatory position to successfully execute this pivot. For example, this evaluation found that since July 2017, the program team has made improvements in its capacity to meaningfully engage stakeholders. Respondents to a community survey also said that they were provided with fit-for-purpose information about the scheme and flood risks in the area and most landholders find the way this information is provided to them to be useful.

There is scope for the program to further enhance its capacity and professionalism in stakeholder engagement and thus successfully transition from an asset management program towards a more holistic flood management program. Regardless, it is important to acknowledge that the program has come a long way from where it was in 2015, with little to no capacity for stakeholder engagement resulting in a challenging situation needing to be addressed on the Wallalong Levee. The next step in the program's evolution will require embedding greater stakeholder engagement capabilities within the program team and developing a formal stakeholder engagement strategy.

The program has also successfully embedded environmental protection and restoration practices into its systems and processes, resulting in both reduced negative impacts to the environment from asset management and replacement activities and in substantial progress towards restoring the catchment's ecological integrity. These substantial improvements are the result of momentum towards a more holistic approach to flood mitigation that is palpable within the team and which is likely to drive further improvements going forward.

4 Recommendations

4.1 Introduction

The recommendations emerging from this evaluation are made in the context of the recent Scheme Review. It is not the role of this evaluation to re-assess or question the recommendations of that Review, particularly those of a technical nature relating to flood management under a changing climate. However, this evaluation has implications for how the recommendations of the Scheme Review are implemented. Moreover, because this evaluation is retrospective (2017-2021), it is appropriate that any recommendations focus on aspects of the evaluation findings that are most likely to impact upon or influence any future adaptations to the program. Because of these considerations, the recommendations made in this report are *additional* to those from the Scheme Review and are not intended to challenge those.

Furthermore, because this is not an evaluation of the technical merits of how the scheme and its management functions, it is not appropriate for the evaluators to make recommendations of a technical nature (e.g., relating to how the scheme's design might be changed).

In reference to our conclusions, the evaluators have considered that any recommendations from this evaluation can be considered within three broad groups:

1. How the program manages the scheme from a technical (asset management, engineering, environmental management) perspective.
2. How the program engages with the community and key stakeholders to implement its scheme management programs, particularly considering the recommendations of the Scheme Review about building community resilience.
3. How the program addresses the future challenges facing the scheme and its management, considering the findings of the Scheme Review.

With reference to 1. above, the evaluation has found that the technical management and operation of the scheme and the way it balances environmental and economic considerations has improved since 2017 and is currently working well. No specific recommendations are necessary, except one (recommendation 6) around the need for more capital expenditure into the scheme.

With reference to 2. above, five recommendations are made (below), which focus on enhancing the capacity of the program to engage the community and stakeholders and enhance the program's preparedness to implement the Scheme Review.

With reference to 3., there is significant technical work to be undertaken to inform the future design/re-design and management of the scheme considering the Scheme Review recommendations. It is beyond the scope of this evaluation to make recommendations in respect of this work.

4.2 Recommendations

1. Consider ways to further strengthen the program team's stakeholder engagement expertise

While the program team's capacity for stakeholder engagement has improved since July 2017 through training and new processes and technologies, the importance of stakeholder engagement to the successful functioning of the program into the future requires dedicated professional stakeholder

engagement expertise. This will be particularly relevant to the program as it seeks to adapt to the recommendations of the Scheme Review.

The program team should consider how this professional capacity could be injected into the team. This could involve better leveraging the stakeholder engagement expertise and resources available in DPE-Water; hiring a stakeholder engagement professional; bringing in external stakeholder engagement specialists for targeted input into the program, or a combination of such actions. What is likely to be important is to make stakeholder engagement a more central focus of the work of the program.

2. Enhance the provision of information about the scheme to all stakeholders

Information about the scheme and flood risks more broadly are essential to fostering community resilience to flooding. The community has indicated that the following would make them more resilient to flooding:

- Better flood warning systems (including better mobile phone reception) and prediction of areas of inundation, road closure, etc.
- More information on where to go for assistance, who to call, etc.
- More information about plans for works associated with the scheme, on a regional basis (i.e., an understanding of the bigger picture).

Better flood warning systems are outside the purview of the scheme. Regardless, there is currently no strategy within the program to provide information that effectively fosters resilience. The program could outline clearly defined and feasible actions to meet these needs and further consult the community and other relevant stakeholders to understand any other needs they may have to effectively cope with near- and longer-term flood risks.

This evaluation also found that word-of-mouth is the most common means that surveyed residents received information about the scheme, and most indicated that this was the most appropriate form of communication for them. Considering this finding, the program should consider an explicit community engagement strategy that seeks to maximise the impact of these networks across the community. This could involve the identification of volunteer community champions for the scheme that can take some responsibility for sharing information about the scheme with their neighbours and networks. Such champions could be provided with information kits that they could draw on to provide their networks with information about the scheme that is relevant to them.

3. Strengthen collaboration between program, relevant agencies and local councils to build greater community resilience to flooding

The program should explore ways to strengthen collaboration with relevant partners such as SES, LLS, Resilience NSW and local councils. This could be strengthened in diverse ways, such as:

- better defining stakeholder roles and responsibilities for building local resilience to flooding
- identification and implementation of joint projects for building community resilience to flooding through, for example, deeper community engagement in emergency management and preparedness
- jointly sponsoring research into community resilience
- jointly seeking grant funding for resilience-building actions through agencies such as Resilience NSW.

Enhanced collaboration could be achieved by leveraging existing processes (e.g., the Coastal Management Program). However, this is to be achieved, the program cannot feasibly be solely responsible for building community resilience to flooding; it needs to be a coordinated effort.

4. Plan for and fund the shift towards a more holistic flood management approach

The shift towards the more holistic flood management approach called for by the Scheme Review will require careful planning and funding to execute. This could include developing an implementation plan to deliver on the Review's recommendations.

Current funding for the program is appropriate for an asset management program, but the shift towards the more holistic approach to flood management called for in the Scheme Review will require more funding to support stakeholder engagement. Such funding will likely need to be directed towards funding staff with professional stakeholder engagement capabilities, stakeholder engagement systems and activities, and the long-term investment and work required for effective wetland restoration and management.

5. Build organisational structures and processes for the program to work with councils and landholders to restore ecological entities

The restoration of ecological entities such as wetlands (identified as key entities for flood mitigation considering the likely impact of climate change by the Scheme Review) cannot be solely achieved by the program; councils have a major role to play through their planning and development strategies and plans. Landholder cooperation is also required to restore wetlands on private property. The program should consider what structures and processes might be required for the program team to collaborate effectively with councils and landholders to restore wetlands in the region. Without such structures, this dimension of the shift called for by the Scheme Review is unlikely to be realised.

6. Quantify the amount of capital investment required for effective management of both larger and smaller scheme assets

Numerous respondents in this evaluation highlighted the urgent need for capital investment to ensure scheme assets can be replaced as they reach the end of their service-life. These individuals pointed out that this is because there has been very little capital investment in the scheme for 20 years and many of the assets are nearing the end of their 50-year lifespan.

Although the Scheme Review is calling for a shift away from the current focus on infrastructure, it does not call for abandoning scheme assets. As such, the program should clearly establish the nature and quantum of works and the amount of capital investment required to maintain and/or replace scheme assets. and the program then needs to seek to secure such funding as far ahead into the future as possible.

5 Appendix 1 – Document register

Code	Name
DOC01	20200203 - FINAL REPORT - Hydraulic and gate change on the Hunter Valley Flood Mitigation Scheme - SCHEME REVIEW - HVFMS.PDF
DOC02	20180124 - CBA Natural Values Assessment - SCHEME REVIEW - HVFMS.PDF
DOC03	20180124 -CBA METHODOLOGY FINAL - SCHEME REVIEW - HVFMS.PDF
DOC04	20180926 - STATUS REPORT - WRL Status Report 2 Hydrology Review WRL - September 2018 - Scheme Review - HVFMS.PDF
DOC05	20181114 - STATUS REPORT - WRL Status Report 3 Flood Behaviour Interpretation (DRAFT) - February 2019 - SCHEME REVIEW - HVFMS(2).pdf
DOC06	20181510 - STATUS REPORT - WRL Status Report 1 Data Gap Analysis - September 2018 - SCHEME REVIEW - HVFMS.PDF
DOC07	20190328 - STATUS REPORT - WRL Status Report 4 Asset Performance and Vulnerability - April 2019 - SCHEME REVIEW - HVFMS.PDF
DOC08	20190522 - DISCUSSION PAPER - WRL Report 5 Adaptation Pathways - June 2019 - SCHEME REVIEW - HVFMS.PDF
DOC09	20171017 - REPORT - GHD Literature Review of scheme - SCHEME REVIEW - HVFMS.DOCX
DOC10	20180824 - SURVEY - SGSWRL Scheme Review - SCHEME REVIEW - HVFMS.PDF
DOC11	20190220 - REPORT - Scheme Review survey results report by Myriad Research - SCHEME REVIEW - HVFMS.DOC
DOC12	20210930 - Audit - Governance Healthcheck Report -HVFMS.PDF
DOC13	20210930 - Audit Certificate - FY2020-21 FINAL - HVFMS.PDF
DOC14	DRAFT Asset Management Plan - 2022 23 - HVFMS.docx
DOC15	Internal Audit of the Hunter Valley Flood Levee IAB 2015.PDF
DOC16	HVFMS Sendai framework.DOCX
DOC17	Local Disaster Risk Reduction Plan-Template.DOCX
DOC18	sendai assessment tool _ HVFMS.XLSM
DOC19	20181204 - Review Of The Hunter Valley Flood Mitigation Scheme Volume 1 Report and Executive Summary (Mounser, G. 1998) - HVFMS.PDF
DOC20	20181204 - Review Of The Hunter Valley Flood Mitigation Scheme Volume 2 Appendices (Mounser, G. 1998) - HVFMS.PDF
DOC21	APPENDIX 1 - DOC18937291 - 20181204 - Flood Mitigation Scheme Volume 1 Report and Executive Summary (Mounser, G. 1998) - HVFMS.PDF
DOC22	APPENDIX 2 - DOC18934296 - 20181204 - Flood Mitigation Scheme Volume 2 Appendices (Mounser, G. 1998) - HVFMS.PDF
DOC23	20210603 - Final Draft - Microbat Management Plan 4898_R02_V2 - HVFMS.PDF

Code	Name
DOC24	20190329 Strategy - HVFMS Community Engagement strategy V2 - HVFMS.PDF
DOC25	Scheme Review survey results report by Myriad Research - SCHEME REVIEW - HVFMS.doc
DOC26	SURVEY - SGS WRL Scheme Review - SCHEME REVIEW - HVFMS.pdf
DOC27	FY18 HLLS report Q1.PDF
DOC28	FY18 HLLS report Q2.PDF
DOC29	FY18 HLLS report Q3.PDF
DOC30	FY18 Q4 HLLS Report.PDF
DOC31	FY19 HLLS report Q1.PDF
DOC32	FY19 HLLS Report Q2.PDF
DOC33	FY19 HLLS report Q3.DOCX
DOC34	FY19 HLLS report Q4.PDF
DOC35	FY20 HLLS report Q1.PDF
DOC36	FY20 HLLS report Q2.DOCX
DOC37	FY20 HLLS report Q3.DOCX
DOC38	FY20 HLLS report Q4.PDF
DOC39	FY21 HLLS report Q1.PDF
DOC40	FY21 HLLS report Q2.PDF
DOC41	FY21 HLLS report Q3.DOCX
DOC42	FY21 HLLS report Q4.DOCX
DOC43	20210930 - Audit - Governance Healthcheck Report -HVFMS.PDF
DOC44	20210930 - Audit Certificate - FY2020-21 FINAL - HVFMS.PDF
DOC45	20171127_Minutes_Team Meeting.docx.DOCX
DOC46	20171204_Agenda_Team Meeting.docx.DOCX
DOC47	20171204_Minutes_Team Meeting.DOCX
DOC48	20180109_Minutes_Team Meeting.DOCX
DOC49	20180129_Minutes_Team Meeting.DOCX
DOC50	20180522_Agenda_Weekly Team Meeting.DOCX
DOC51	20180522_Minutes_Weekly Team Meeting.DOCX
DOC52	20180529_Agenda_Weekly Team Meeting.DOCX
DOC53	20180529_Minutes_Weekly Team Meeting.DOCX

Code	Name
DOC54	20180612_Agenda_Weekly Team Meeting.DOCX
DOC55	20180612_Minutes_Weekly Team Meeting.DOCX
DOC56	20180619_Agenda_Weekly Team Meeting.DOCX
DOC57	20180619_Minutes_Weekly Team Meeting.DOCX
DOC58	20180716_Agenda_Weekly Team Meeting.DOCX
DOC59	20180716_Minutes_Weekly Team Meeting.DOCX
DOC60	20181126_Agenda_Weekly Team Meeting.DOCX
DOC61	20181126_Minutes_Weekly Team Meeting.DOCX
DOC62	20181214 - Agenda - Weekly Team Meeting.DOCX
DOC63	20181214_Minutes_Weekly Team Meeting.DOCX
DOC64	20190123_Agenda_Weekly Team Meeting.DOCX
DOC65	20190123_Minutes_Weekly Team Meeting.DOCX
DOC66	20190219_Agenda_Weekly Team Meeting.DOCX
DOC67	20190219_Minutes_Weekly Team Meeting.DOCX
DOC68	20190315_Agenda_Weekly Team Meeting.DOCX
DOC69	20190318 - Minutes - Fortnightly Team meeting - HVFMS.DOCX
DOC70	20190401 - Agenda Fortnightly Team Meeting - HVFMS.DOCX
DOC71	20190401 - Minutes Fortnightly Team Meeting - HVFMS.DOCX
DOC72	20190429 - Minutes Fortnightly Team Meeting - HVFMS.DOCX
DOC73	20190513 - Agenda Fortnightly Team Meeting - HVFMS.DOCX
DOC74	20190805 - Agenda - Fortnightly Team Meeting 05.08.2019- HVFMS.DOCX
DOC75	20190909- Agenda - Fortnightly Team Meeting 09.09.2019 - HVFMS.DOCX
DOC76	20191125- Agenda - Fortnightly Team Meeting 25.11.2019 - HVFMS.DOCX
DOC77	20191210 - Agenda - Fortnightly Team Meeting 10.12.2019 - HVFMS.DOCX
DOC78	20200203 - Agenda - Fortnightly Team Meeting 3.2.2020 - HVFMS.DOCX
DOC79	20200217 - Agenda - Fortnightly Team Meeting 17.2.2020 - HVFMS.DOCX
DOC80	20200707 - MEETING MINUTES - Fortnightly Team meeting 07.07.2020 - HVFMS.DOCX
DOC81	20200818 - MEETING MINUTES - Fortnightly Team meeting 21.08.2020 - HVFMS.DOCX
DOC82	20200915 - MEETING MINUTES - Fortnightly Team meeting 15.09.2020 - HVFMS.DOCX
DOC83	20201012 - MEETING MINUTES - Fortnightly Team Meeting 13.10.2020 - HVFMS.DOCX

Code	Name
DOC84	20201027 - MEETING MINUTES - Fortnightly Team Meeting 27.10.2020 - HVFMS.DOCX
DOC85	20201123 - MEETING MINUTES - Fortnightly Team Meeting 23.11.2020 - HVFMS.DOCX
DOC86	20201208 - MEETING MINUTES - Fortnightly Team Meeting 08.12.2020 - HVFMS.DOCX
DOC87	20201222 - MEETING MINUTES - Fortnightly Team Meeting 19.01.2021 - HVFMS.DOCX
DOC88	20201222 - MEETING MINUTES - Fortnightly Team Meeting 22.12.2020 - HVFMS.DOCX
DOC89	2020303 - AgendaMinutes - Fortnightly Team Meeting 02.03.2020 - HVFMS.DOCX
DOC90	2020317 - Agenda Minutes - Fortnightly Team Meeting 17.03.2020 - HVFMS.DOCX
DOC91	2020401- Agenda Minutes - Fortnightly Team Meeting 01.4.20 - HVFMS.DOCX
DOC92	2020415 - Agenda Minutes - Fortnightly Team Meeting 15.4.20 - HVFMS.DOCX
DOC93	2020428 - Agenda Minutes - Fortnightly Team Meeting 28.4.20 - HVFMS.DOCX
DOC94	2020511 - Agenda_Minutes - Fortnightly Team Meeting 11.5.2020 - HVFMS.DOCX
DOC95	2020526 - Agenda_Minutes - Fortnightly Team Meeting 26.05.2020 - HVFMS.DOCX
DOC96	2020609 - Agenda_Minutes - Fortnightly Team Meeting 09.06.2020 - HVFMS.DOCX
DOC97	20210202 - MEETING MINUTES - Fortnightly Team Meeting 02.02.2021 - HVFMS.DOCX
DOC98	20210304 - MEETING MINUTES - Fortnightly Team Meeting - 04.03.2021 - HVFMS.DOCX
DOC99	20210316 - MEETING MINUTES - Fortnightly Team Meeting - 16.03.2021 - HVFMS.DOCX
DOC100	20210413 - MEETING MINUTES - Fortnightly Team Meeting - 13.04.2021 - HVFMS.DOCX
DOC101	20210525 - MEETING MINUTES - Fortnightly Team Meeting - 25.05.2021 - HVFMS.DOCX
DOC102	20210621 - MEETING MINUTES - Fortnightly Team Meeting - 21.06.2021 - HVFMS.DOCX
DOC103	20210708 - MEETING MINUTES - Fortnightly Team Meeting - 08.07.2021 - HVFMS.DOCX
DOC104	20210727- MEETING MINUTES - Fortnightly team meeting - 22.07.2021 - HVFMS.DOCX
DOC105	20210806 - MEETING MINUTES - Fortnightly Team Meeting - 06.08.2021 - HVFMS.DOCX
DOC106	20210819 - MEETING MINUTES - Monthly team meeting - 19.08.21- HVFMS.DOCX
DOC107	20210913 - MEETING MINUTES - monthly team meeting - 13.09.2021 - HVFMS.DOCX
DOC108	20210913 - MEETING MINUTES - monthly team meeting - 15.10.2021 - HVFMS.DOCX
DOC109	20211602 - MEETING MINUTES - Fortnightly Team Meeting 16.02.2021 - HVFMS.DOCX
DOC110	DOCDOC20 799887 20200929 - MEETING MINUTES - Fortnightly Team meeting 29.09.2020 - HVFMS.DOCX
DOC111	SGS HVFMS CBA report - 030220 - scheme review - HVFMS.docx
DOC112	SGS CBA workbook of Pathway B.xlsx
DOC113	SGS CBA workbook of Pathway C.xlsx

Code	Name
DOC114	SGS HVFMS flood impact model - Pathway B.xlsm
DOC115	SGS HVFMS flood impact model - Pathway C.xlsm
DOC116	SGS HVFMS Flood impact model - pivot table of spatial tool outputs.xlsm
DOC117	SGS HVFMS flood impact model - Present-day value of the scheme.xlsm
DOC118	TRIMlock.dat
DOC119	20201023 - EVALUATION PLAN - Climate Change Fund 2017 - 2022 Evaluation Plan - HVFMS.DOCX
DOC120	20180718-Power point-CRG presentation 26-07-2018 of PFAS + PFOS Williamtown area-Williamtown Drian Clearing-HVFMS.PPTX
DOC121	20180724 - FINAL REPORT - WRL Fullerton _igerry Creek Modified Floodgate Design - FULLERTON COVE TILLIGARY CREEK - HVFMS.PDF
DOC122	20181214-REF-Review of Environmental Factors Saltmarsh Tomago Ring Levee - preventative maintenance - HVFMS.DOCX
DOC123	20190508 - ENVIRONMENTAL MANAGEMENT PLAN (EMP) - Upper Hunter EMP (Draft) - Area 15 - HVFMS.DOCX
DOC124	20190830 - Report - For release P S PFAS assessment report - Woody Debris Project - HVFMS.PDF
DOC125	20191024 - Report - Nebo Drain Final - Contaminated Sites Study - HVFMS.PDF
DOC126	20191115 - DRAFT EMP - Lower Hunter Valley Flood Mitigation Scheme Program (Revised draft) - 2020 - HVFMS.ZIP
DOC127	20200320 - endorsement - Weed Management Strategy - Lower - HVFMS.PDF
DOC128	20200522 - Final Report - Contaminated Sites Study - HVFMS.PDF
DOC129	20200817 - PERMIT - PN20268 – Harm marin_enance at Hunter Valley Flood Mitigation Scheme - July 2020 - July 2025 - HVFMS.PDF
DOC130	20200817 - S.199 – Dredge and reclamatio_ted with floodgate maintenance at Hunter Valley Flood Mitigation Scheme - HVFMS.PDF
DOC131	20210531 - Stage 2 - Final Report - Tidal Floodgate Assessment of Inundation Risk and Opportunities WRL - TFAG - HVFMS.PDF
DOC132	20210603 - Final Draft - Microbat Management Plan 4898_R02_V2 - HVFMS.PDF
DOC133	Fullerton Cove Waste Management Plan - Mechanical Weed Removal - Final.PDF
DOC134	Notes and documents for Clear Horizon.docx
DOC135	OEH Mechanical Weed Removal .pptx.PPTX

6 Appendix 2 – Data collection tools

HVFMS Interview and Consultation Guides

Introductory e-mails

Program team

Hello,

As you would be aware, Clear Horizon has been contracted by DPIE to undertake an evaluation of the Hunter Valley Flood Mitigation Scheme program.

As a member of the program team, you will have important insights into the program that will contribute to this evaluation. We would thus like to request that you take part in a confidential interview over Microsoft Teams of approximately 45-60 minutes in the week commencing Monday the 15th of November.

Please respond to this e-mail with 2-3 convenient time slots and I will send through a calendar invite.

If you have any questions about the evaluation, please contact Adrian Milne from DPIE at adrian.milne@dpi.e.nsw.gov.au or on (02) 4908 6887. We are also able to provide you with the interview questions in advance, should you desire.

Thank you in advance,

Other stakeholders

Hello,

Clear Horizon Consulting has been contracted by DPIE to undertake an evaluation of the Hunter Valley Flood Mitigation Scheme program.

More specifically, this evaluation is evaluating the effectiveness of the program to achieve its intended outcomes, the quality of the program's implementation, its efficiency, and lessons learned about what's working and what could be done better. The ultimate purpose of this evaluation is to inform ongoing learning and improvement in the program.

You have been identified by the DPIE program team as someone that is likely to have important insights to contribute to this evaluation. We would thus like to request that you take part in a confidential interview over Microsoft Teams of approximately [time] in the week commencing Monday the 15th of November.

Please respond to this e-mail with 2-3 convenient time slots and I will send through a calendar invite.

If you have any questions about the evaluation, please contact Adrian Milne from DPIE at adrian.milne@dpi.e.nsw.gov.au or on (02) 4908 6887. We are also able to provide you with the interview questions in advance, should you desire.

Thank you in advance,

Preamble for all interviews and consultations

Hello, my name is [interviewer name] from Clear Horizon Consulting. We've been contracted by the NSW Department of Planning, Industry and Environment (DPIE) to undertake an evaluation associated with the Hunter Valley Flood Mitigation Scheme (the Scheme). We are not evaluating the Scheme itself, we are evaluating the program that includes two activities:

Care and maintenance of the Scheme

Riverbank works in the Upper Hunter area, including the Hunter Aboriginal Riverkeeper Team (HART)

We are considering all activities conducted since July 2017. The purpose of this evaluation is to assess the flood mitigation, environmental, and social outcomes from the program, overall value for money, and the performance of the DPIE program team.

You've been identified as someone that is well-positioned to provide insight that will be important to this evaluation.

This interview is voluntary and confidential. You can withdraw from the interview at any stage and are not compelled to answer any question you don't wish to answer. The interview will be recorded and transcribed by a trusted third-party transcription service. Both the recording and transcript will be safely stored by Clear Horizon and anything you share with me today will be de-identified prior to being reported in the final evaluation report. As such, I encourage you to provide frank responses to all questions.

You can contact me after the interview concludes if you would like to withdraw or amend your comments.

This interview should take between:

Program team/ Hunter LLS/ Contractors and suppliers: 45-60 minutes;

DPIE Water Policy team/ HART: 10-15 minutes;

Councils, including LALCs: 20-30 minutes.

Do you have any questions? Do you consent to proceed? Y/N

Close for all interviews and consultations

Thank you for your time and your helpful input into the evaluation.

If you would like to amend anything you have mentioned today or would no longer like your comments used in this evaluation you can reach out to the manager of this evaluation, Francesco Gimelli, on 0431 599 854.

If you would like to know more about this evaluation, please contact Adrian Milne from the Department of Planning, Industry and Environment at adrian.milne@dpi.e.nsw.gov.au.

Program staff

4. Can you please start by telling me a bit about yourself and your involvement in the program?
(prompt: Upper vs Lower Hunter)

Infrastructure outcomes

The program has been effective in maintaining scheme asset integrity. The risk to integrity was low, apart from following the March 2021 floods.

The only major flood event since 2017 was the March 2021 floods, for which the Scheme largely held up. Several minor defects occurred in response to this flooding event.

The program maintains the scheme through both reactive and preventative works. There are a number of 'major projects'. Area 15 works exist largely separately to the stream, and were delivered as planned.

The first set of questions relate to the extent to which the Scheme assets have reduced risk to infrastructure, property and lives [KEQ1]

5. In your view, how effective has the program been in maintaining flood mitigation asset integrity since 2017? [1a].
6. And how effective do you feel the scheme has been in decreasing potential damage caused by flood since 2017? [1a].
7. What do you think would have happened had the program ceased to exist in 2017?
8. From your perspective, is the frequency of asset management actions appropriate? Why / why not?
9. Do you believe investment in the Scheme assets is adequate? [1c.] (probe: prioritisation of high-risk over low-risk defects)
 - a. If not, why not? What would 'adequate' investment look like?

Environmental outcomes

No evidence of environmental outcomes for Areas 1-14.

The riverbank restoration works (Area 15) resulted in revegetation, and reduced environmental risk

The following questions relate to the extent to which the program has maintained or improved environmental outcomes since July 2017.

10. Our review of the documentation has revealed no specific evidence of environmental outcomes for Areas 1-14. Are you aware of any environmental outcomes in these areas through the program and/or 'major projects'?
 - a. If yes, in what ways has the program restored the environment in these areas? [2a]

11. In Area 15, revegetation and other works were undertaken which documentation suggests has reduced environmental risk. In your opinion, what have the environmental outcomes of these works been?
 - b. What were the outcomes from the riverbank restoration works?
 - c. And do you feel that the program improved any other environmental conditions in the catchment? (probe: ground cover in riparian zones, revegetation, water quality improvements, reduction in weeds, increase in native vegetation)

Aboriginal cultural and heritage outcomes

HART project provided employment and training to Aboriginal peoples

The next questions relate to the extent to which the program has contributed to Aboriginal cultural and heritage values.

12. How has the program sought to safeguard and/or strengthen Aboriginal cultural and heritage values? (prompt: engagement of local Aboriginal communities in the program)
 - d. What were the outcomes of these efforts?

Stakeholder engagement

No data on community outcomes, but many major projects incorporated a community engagement project.

The Community Engagement Strategy outlines four stakeholder groups: 1) decisionmakers (mainly those with decision-making power), 2) partners (those state government agencies that participate in some activities), 3) suppliers (who provide services), and 4) communities (mainly local councils, landowners, inhabitants in flood prone areas, and other groups). The community group is the focus of the next set of questions.

13. How capable and confident do you believe the program team is in engaging stakeholders?
 - e. What factors have hindered or enabled the team’s capacity and confidence in this?
14. What do you see as the role of local government in engaging the community on matters relating to the Scheme and its management?
 - f. How well do you feel the program team has engaged local government in matters relating to the scheme and its management and operation?

Processes

The program was largely delivered as planned.

No changes in response to the Scheme Review were recorded in docs.

Now I want to ask a few questions about the Scheme Review (2020), which called for a significant shift from the BAU of infrastructure management towards a focus on building the resilience of communities and wetland restoration.

15. In your experience, is the program making this shift?

- g. If not, why not? What do you think are the barriers to the program making this shift?
- h. If yes, what do you think has been facilitating this shift? And, what else might be required to enable this shift?

The next set of questions are about how the program adheres to the five floodplain management principles in the Water Management Act (2000).

16. I'm going to read out each of the principles and ask you to tell me how well you feel the program adheres to it and the reasons for your assessment [5d].

- i. floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated
- j. the impacts of flood works on other water users should be avoided or minimised
- k. the existing and future risk to human life and property arising from occupation of floodplains must be minimised.
- l. geographical and other features of major cultural, heritage or spiritual significance should be protected
- m. the social and economic benefits to the community should be maximised

Efficiency

17. In your experience, which areas of the program have been delivered efficiently? [6b]

18. And do you feel there are any areas of the program that are not being delivered efficiently? Why? [6b]

- n. Do you feel there might be ways to deliver these areas of the program more efficiently?

Closing

19. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

DPIE-Water Policy Team

To start with, let me explain that I'm going to be asking you questions about how the program engages stakeholders, how it has responded to the review of the Scheme completed in 2020 and its adherence to

the flood management principles outlined in the Water Management Act (2000). If you don't feel you know enough about a particular aspect of the program to answer any of these questions, please don't hesitate to say so.

20. Can you please start by telling me a bit about yourself and your involvement in the program?

Stakeholder engagement

The Community Engagement Strategy outlines four stakeholder groups: 1) decisionmakers (mainly those with decision-making power), 2) partners (those state government agencies that participate in some activities), 3) suppliers (who provide services), and 4) communities (mainly local councils, landowners, inhabitants in flood prone areas, and other groups). The community group is the focus of the next set of questions.

21. How capable and confident do you believe the program team is in engaging stakeholders?

o. What factors have hindered or enabled the team's capacity and confidence in this?

22. What do you see as the role of local government in engaging the community on matters relating to the Scheme?

p. How well do you feel the program team has engaged local government in matters relating to the Scheme?

Scheme review

Now I want to ask a few questions about the Scheme Review (2020), which called for a significant shift from the BAU of infrastructure management towards a focus on building the resilience of communities and wetland restoration.

23. In your experience, is the program making this shift?

q. If not, why not? What do you think are the barriers to the program making this shift?

r. If yes, what do you think has been facilitating this shift? And, what else might be required to enable this shift?

Program adherence to principles in Water Management Act

The next set of questions are about how the program adheres to the five floodplain management principles in the Water Management Act (2000).

24. I'm going to read out each of the principles and ask you to tell me how well you feel the program adheres to it and the reasons for your assessment [5d].

s. floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated

t. the impacts of flood works on other water users should be avoided or minimised

u. the existing and future risk to human life and property arising from occupation of floodplains must be minimised.

v. geographical and other features of major cultural, heritage or spiritual significance should be protected

w. the social and economic benefits to the community should be maximised

Closing

25. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

Procurement officer

26. To what extent was competitive tendering used for procurement of services for the program?
27. From your perspective, how efficiently has the program procured services?
28. What, if anything, could the program do to procure services more efficiently?

Closing

29. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

Hunter LLS, Contractors & suppliers, SES, RMS

30. Can you please start by telling me a bit about yourself and your involvement in the program?
(prompt: Upper vs Lower Hunter)

Infrastructure outcomes

The first set of questions relate to the extent to which the Scheme assets have reduced risk to infrastructure, property and lives [KEQ1].

31. In your view, how effective has the program been in maintaining flood mitigation asset integrity since 2017? [1a].
32. And how effective do you feel the scheme has been in decreasing potential damage caused by flood since 2017? [1a].
33. What do you think would have happened had the program ceased to exist in 2017?
34. Do you feel that the program is consistent with flood management best practice? Why / why not?
35. From your perspective, is the frequency of asset management actions appropriate? Why / why not?
36. Do you believe investment in the Scheme assets is adequate? [1c.] (probe: prioritisation of high-risk over low-risk defects)
 - x. If not, why not? What would 'adequate' investment look like?

Environmental outcomes

The following question relates to the extent to which the program has maintained or improved environmental outcomes since July 2017. Please only comment in relation to areas of the program that you have been involved with.

37. What, if any, do you feel have been the environmental outcomes of the program?

Scheme Review

Now I want to ask a few questions about the Scheme Review (2020), which called for a significant shift from the BAU of infrastructure management towards a focus on building the resilience of communities and wetland restoration.

38. In your experience, is the program making this shift?

- y. If not, why not? What do you think are the barriers to the program making this shift?
- z. If yes, what do you think has been facilitating this shift? And, what else might be required to enable this shift?

Closing

39. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

Hunter Aboriginal Riverkeeper Team (HART)

40. Can you please start by telling me a bit about the HART program and your involvement in it?

Outcomes for local Aboriginal communities

- 41. How well is the HART program engaging local Aboriginal communities?
- 42. What are the outcomes from this project for local Aboriginal communities?
- 43. What, if anything, needs to be done to either sustain or improve engagement of local Aboriginal communities?

Environmental outcomes

- 44. In what ways has HART contributed to restoring the environment of the Hunter Valley? [2a]
 - aa. What were the outcomes from this restoration? (probe: ground cover in riparian zones; revegetation; water quality improvements; reduction in weeds / increase in native vegetation)

Aboriginal Heritage outcomes

- 45. In what ways has HART contributed to protecting and/or enhancing Aboriginal cultural heritage within the Hunter Valley? [3]

Closing

46. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

Councils, inc. Joint Organisation and LALCs

47. Can you please start by telling me a bit about yourself and your involvement in the program?
(prompt: Upper vs Lower Hunter)

Communication

The following set of questions are about how the HVFMS program communicate with you and your communities.

48. What information do councils need about the Scheme?
49. What about the community? What information do you feel they need about the Scheme?
50. Do you feel that the HVFMS program clearly understand the information that councils and the community need?
51. How accessible is the information provided by the program to councils and communities?
52. What impact, if any, do you feel the program has had on landholder compliance with development requirements in your area? (prompts: increased, stayed the same, worsened)
53. And what impact, if any, do you feel the program has had on landholders' understanding of flood risks? (prompts: improved, stayed the same, decreased)

Engagement

54. Overall, how well do you feel the program is engaging the community (including councils)?
- bb. What, if anything, do you feel is working particularly well in this regard?
 - cc. What, if anything, do you feel hasn't been working well in this regard?
55. Is there anything that you feel the program could do to improve how it engaged community?

Scheme Review

Now I want to ask a few questions about the Scheme Review (2020), which called for a significant shift from the BAU of infrastructure management towards a focus on building the resilience of communities and wetland restoration.

56. In your experience, is the program making this shift?
- dd. If not, why not? What do you think are the barriers to the program making this shift?
 - ee. If yes, what do you think has been facilitating this shift? And, what else might be required to enable this shift?

Aboriginal Heritage outcomes (Ask of LALC's only)

57. In what ways has HART contributed to protecting and/or enhancing Aboriginal cultural heritage within the Hunter Valley? [3]

Closing

58. Do you have any other comments you'd like to make about the program that perhaps I haven't asked you about?

Community Survey: HVFMS

Preamble

Hi there, my name is _____, I'm calling about the Hunter Valley Flood Mitigation Scheme today on behalf of the DPIE today. I hope you are doing well today.....(Pause) So you know the reason for my call is because DPIE (**If required:** Department of Planning, Industry, and Environment) has asked us to gather information to help you or the community to be more prepared to be floods or prepare to be flooded in

The DPIE has contracted Market Solutions to speak with people in the Hunter Valley Region... If you could help us out with a 3-7 minute study... that would be great...

Is it ok to continue? I promise to be quick.

[If required: Even if you do not encounter flooding, for instance infrastructure and the community around you may be impacted and you may have ideas or information that would help us]

[Mobile Only:] (As you are on your mobile, I will just check it is safe to talk - you are not driving?) Is it okay to continue?

[If required: I will make it as quick as possible / why don't we start and see how it goes, you can stop at any time]

Can I confirm your postcode is

[Important Interviewer note- if their postcodes is 2124- that is close enough to say no but say yes to the next question... that they live in the Hunter Valley Region]

Questions

59. So, to begin with... for the first two questions, we will be asking about two different scenarios. Firstly about extreme but less frequent flooding, then about less extreme but more frequent floods. [Above sentence is optional to read]

1. On a scale of 1-5, where 1 is 'low risk' and 5 is 'high risk', how would you rate the risks to your person, property and/or assets from **extreme but less frequent floods**?

[Important Interviewer note: There is a chance that people say it is hard to rate because half their assets are safe with no risk of flooding but their livestock may be impacted so they find it hard to rate- so we ask them to rate it as a whole.

2. and how about for less extreme but more frequent floods? [if required] (again on a scale of 1-5, where 1 is 'low risk' and 5 is 'high risk')

3. Are you aware of the Hunter Valley Flood Mitigation Scheme?

a. Yes (continue survey)

4. Are you a landholder that has assets of the Hunter Valley Flood Mitigation Scheme on your, for e.g., Inlet pit, flood gate, levees (dirt embankment), drainage channel, levee, bank or protection structure.

[Interviewer Note: MUST read as this is an important group of people that we reach, there is a chance people may have forgotten a drainage channel that is ill maintained for e.g.]

a. Yes (Continue)

b. No **skip to Q6**

5. Which of the following 6 statements best describe how you feel you have been engaged by the managers of the Scheme? [Read out, select all that apply- So read this out one by one and tick all that applies]

I have contributed to the final say in all decisions relating to the Scheme on my land
 I have actively collaborated with Scheme staff on the implementation of the Scheme
 I have been directly involved in decision-making for the Scheme
 I have been asked to provide feedback on the Scheme or elements of the Scheme
 I have been provided with information about the Scheme or elements of the Scheme
 I have not been engaged
 Other?
 Don't know/unsure (don't read out)?

6. On a scale of 1-5, where 1 is 'no protection' and 5 is 'high protection', what level of protection from flooding do you feel the Hunter Valley Flood Mitigation Scheme provides you, your property and/or your assets? Firstly for yourself, and then a second rating for your property and/or assets? (include option for 'unsure')
7. On a scale of 1-5, where 1 is 'unprepared' and 5 is 'very prepared', how prepared do you feel to manage flood risks to you, your property and/or assets? Firstly, for yourself, and then a second rating for your property and/or assets? [include option for 'unsure']
8. Have you received or seen, or heard about information about the Scheme and flood risks since July 2017?
- Yes (continue survey)
 - No (skip to Q14 "what information do you need to manage floods".)
 - Don't know/unsure

The next few questions are about the communication **methods** used. Afterwards, we will talk about the information itself.

9. How did you receive this information? [Don't read list- ONLY read out if they need a prompt] [Confirm closest categories with respondent]

(allow respondent to identify and tick all that apply; if 'other', please specify)

Community events	A1
Briefing sessions	A2
Flood related forums	A3
Annual guided tour of assets	A4
Media releases	A5
Websites	A6
Annual letter to landholders	A7
Text messages	A8

[Important- Wait to read to clarify if information above is from local council]

Do you know if the engagement was through local council? A9

Other (please specify)

10. Were these good ways for you to receive this information?

Yes (which methods were the most useful for you, and why?)

No (which methods were not useful to you, and why?)

[Interviewer note: IMPORTANT- you must use the A1 to A9 codes in green above]

Now we are going to talk about the information itself.

11. On a scale of 1-5, where 1 is 'not at all' and 5 is 'a lot', to what extent did this information contribute to your awareness and understanding of flood risks from different sizes of flood events?

[prompt: Sizes of flood events meaning more frequent but less extreme floods; less frequent but more extreme floods]

12. On a scale of 1-5, where 1 is 'not at all' and 5 is 'a lot', to what extent did this information contribute to your awareness and understanding of how the risk of different sized floods may be impacted by climate change in your area? (include option for 'unsure')
13. On a scale of 1-5, where 1 is 'not at all easy' and 5 is 'very easy', how easy was the information to understand?
14. What information do you need to best help you manage flood risks? [Prompt: for instance, the information you need on how you prepare for floods, how you deal with floods on the way or during]

My supervisor validates 10% of our calls, for this reason, may I please have your first name or a pseudonym?

Thank you for your feedback for the Flood Mitigation Scheme – in order to contextualise this data, we will end with two questions

15. Are you a renter or the owner of the property?
16. Finally, to determine how geographic location influences flood risk, would you be able to provide us with your address, and if you are not comfortable with that, maybe the street name and suburb or closest intersection to your property?

[if respondent is uncertain, can say things like]

1. remember of course that this survey is use only for research and remains confidential, identifying data will be removed and will not be passed on to DPIE.
2. It is important to ensure the needs of the community are met in a targeted fashion, with flood mitigation infrastructure and resources allocated where most needed in areas of greatest risk.
3. It would really help us to ensure the survey data is complete, and we will not be collecting any other personal or demographic data.

Close

Thank you for taking part in this survey.

We comply with the Privacy Act. Data will be confidential and used for research only.

Thank you so much. My name is (...) from Market Solutions, calling on behalf of DPIE,

Would you like the number for our head office, or The Research Society Survey Line?

[Provide numbers if required – Market Solutions: 03 9372 8400 and ask to speak to Alex or Belinda. The Research Society 1300 364 832]