

# **Report on Research Utilisation Review**

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**For the Bushfire CRC**

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## Summary

This report discusses findings based on a survey used to consult the industry on existing and potential research utilisation practices to inform future directions. This survey has been carried out three times, in 2010, 2012 and 2014 and the results compared. This report discusses feedback from the 180 participants from 21 agencies who answered the survey in 2014. These participants were well qualified to answer. They have had a median of 24 years in the fire and emergency services industry and a median of 13 years in their own agency. Of the participants who answered the question about their position in the agency, 16 (12%) were in senior management positions (e.g., Directors); 72 (52%) were in middle management roles (e.g., District Managers) and 50 (36%) had front line responsibilities (e.g., training instructors).

There was a high degree of familiarity with the agency's own strategic plan and a reasonable degree of awareness of Bushfire CRC research outputs. The alignment between the agency's strategic planning and Bushfire CRC research outputs was slightly higher than that reported in 2010 and 2012.

Participants were asked to rate their perceived effectiveness of their agency in terms of its processes to disseminate the Bushfire CRC research; assess and evaluate its impact on practice; implement any changes needed, and monitor processes to track changes. There has been a steady increase in perceived effectiveness with agency capacity to both disseminate the Bushfire CRC research and to assess and evaluate its impact on practice. However, the perception of agency effectiveness in monitoring processes to track evidence-based change has dropped below the level reported in 2010 and remains the lowest of the items canvassed. This **indicates a gap in agency processes and a potential risk for the agencies concerned. It is important that agencies have in place processes of review, assessment and evaluation so that they can demonstrate evidence-based practice.**

Compared to the 2010 results, there has been a steady improvement in reported levels of satisfaction with utilising Bushfire CRC resources such as the Bushfire CRC Web Site, Fire Notes and Research Publications. Overall, and consistent across all three time periods, rankings for these resources providing the skills to *identify what needs to change* and to *help bring about change* are the lowest compared with all other items. These findings indicate that while the Fire Notes and Website play an important role, they are nevertheless limited in their capacity to support agencies to engage in research utilisation practices and need to be supplemented with more active engagement strategies.

In addition, the survey sought to assess the effectiveness of **engagement** in Bushfire research collaborative opportunities (e.g., involvement in the AFAC conference Science Day, Research Advisory Forum, workshops) and the findings were positive. The Bushfire CRC research forum received the lowest scores for satisfaction on the degree to which it (i) *provided information wanted*; (ii) *provided the ability to learn new knowledge and skills*; (iii) *facilitated the understanding of the research* and (iv) *developed skills to bring about change*. The results also indicate that although the Research Advisory Forum may have a range of purposes, its perceived value in terms of its capacity to provide participants with information and understanding about the research has declined since 2010. Survey participants continue to support activities in which they are more deeply engaged, such as workshops and being members of a project team.

The study also found that perceptions about the learning culture (of the industry and of the participant's own agency) had improved compared to reports from previous surveys.

Participants were also asked to provide an assessment of the degree to which key barriers might be impeding research utilisation. Given the findings reported earlier indicating lower levels of confidence in agency capacity to assess and evaluate research impact for agency practice and to monitor changes based on research evidence – as well as concerns about skills needed to initiate change – it was anticipated that a review of potential barriers to research utilisation may yield useful insights. A Factor Analysis revealed that barriers to research utilisation were underpinned by three factors: (i) *Agency Capacity* to make sense of the research, indicating agencies need to develop more effective internal processes for translating the research and sense-making about implications particular to specific agency challenges; (ii) *External Context* which included the overwhelming amount of research outputs and the amount of change occurring in the industry, indicating a need to provide opportunities to step back and strategically consider the big picture. This suggests that peak bodies such as AFAC have strategic opportunities to add value and support to the industry. The third and fourth factors related to *Research Utilisation Enablers* and in this report have been combined into one factor that focusses on what agencies peak bodies such as AFAC and the CRC, can do to improve access to research and to support sense-making about the potential implications of the research for agencies and the industry.

It is important that agencies – and the industry – build capability in developing robust processes of deliberative review, assessment and evaluation so that evidence-based practice can be demonstrated and advanced. These factors all need to be addressed if the industry and involved agencies are to reap the full benefits of Bushfire CRC research.

## Introduction

As part of the Bushfire CRC's research utilisation strategy, stakeholders have been regularly surveyed to assess how they are utilising research in order to gain maximum benefit from their investment. Those surveys have been conducted in 2010, 2012 and again in January 2014. These three time-series data points provide insights into how agencies are engaging the research and capitalising on the utilisation of Bushfire CRC research outcomes. The surveys have been conducted to:

- assist individual agencies to understand their current situation with regard to research utilisation;
- collectively inform further research utilisation programs; and
- provide a measure on current agency uptake for comparison purposes.

The summary of findings presented here can inform the delivery of research utilisation opportunities into the future. Previous reviews of the literature (e.g., Dearing 2009; Owen 2011) suggested that systematic evaluation of research utilisation supports industry effectiveness through developing learning cultures which enable:

- processes to accelerate the pace of adoption;
- increases in the number of adoptions possible from research conducted;
- enhancements in the quality of research implementation;
- sustainability in the use of worthy innovations; and
- demonstration of the research effectiveness at agency and industry levels.

Critical to success in research utilisation is also an understanding of what main barriers might be impeding research outcome and thus need to be overcome. In line with the body of literature associated with barriers to organisational change and adaptation (see for example Funk 1991; Baernholdt and Lang 2007; Elliot and Mihalic 2004; Helmsley-Brown and Oplatka 2005; LaPierre, Ritchey and Newhouse 2004), the surveys have also canvassed selected items identified as potential barriers to research utilisation within agencies.

## Method

The 2012 survey was reviewed and some minor updates were made. The January 2014 survey was distributed to 31 agencies. Agency contacts were requested to distribute the survey to 5-15 people, using the following stratified sample:

- Senior management the most senior person in the organisation responsible for the following areas:
  - Training and development
  - Operations
  - Community safety
  - Knowledge management/innovation/research
- Five persons at middle-management including operational and non-operational personnel (e.g. District Managers)

- Five persons in operational front-line service positions (e.g. volunteers, field operations personnel, community education officers, training instructors).

The purpose of this sampling method was to target personnel who could reasonably be expected to:

- have an understanding of the strategic planning of the agency;
- have some awareness and/or involvement in Bushfire CRC activities; and
- be those persons responsible for implementing any changes needed based on research evidence.

**Table 1: Participants in the 2010, 2012 and 2014 surveys**

Year	N	Agencies responded	Agencies invited
<b>2010</b>	148	15	25 (60%)
<b>2012</b>	94	18	28 (64%)
<b>2014</b>	180	21	31 (68%)

In the 2014 sample, 180 responses were received from 21 agencies (see Table 1). The median number of years that survey participants have been in the industry was 24, and the median number of years within the agency was 13, thus demonstrating the level of experience of those responding.

There was also good participation from a range of the main agency types. Of the people who answered the question, there were 41 (27%) responses from people working in rural fire agencies; 33 (21%) from people working in land management agencies; 27 (18%) from urban agencies; 40 (26%) from agencies that have an emergency management (floods or multiple hazards) role and 13 (8%) responses from people working in related areas of the industry (e.g., Bureau of Meteorology).

It is interesting to note that agency participation (and non-participation) has remained consistent across the three time points. Most of the larger agencies are engaged (across agency types) and non-participation across all three data points included the smaller specialist agencies.

## Survey Analysis

The survey consisted of a number of quantitative Likert-type items where participants were asked to rate their level of agreement on a scale of 1 to 7, with an option for “can’t answer”.

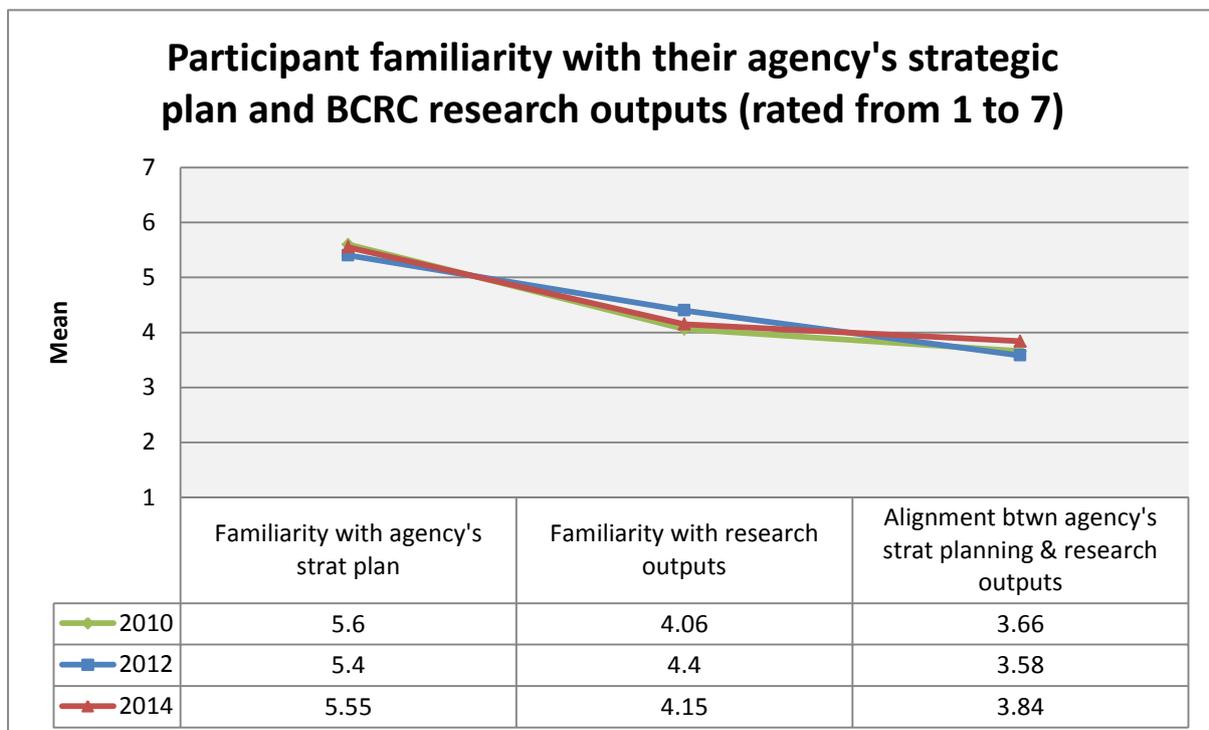
Where appropriate, descriptive summaries and statistics are included to highlight trends between the three surveys. Where the statistical assumptions required for advanced analyses have been met then these analyses have also been performed. For ease of reading, whenever statistical analyses have been performed the details of the calculations are included in an endnote rather than in the text.

## Benchmarking Survey Results

As discussed in the previous 2010 and 2012 studies, in considering whether the overall responses have **endorsed** an item, a benchmark of 4 out of 7 on the scale has been notionally set as a “pass” mark in terms of perceived levels of effectiveness or satisfaction. This is akin to a “report card” approach often used in Management communities of practice. Doing so enables a discussion of the results as feedback from the industry on perceived levels of endorsement for various practices (e.g., research utilisation strategies). From this point of view then, and where appropriate, rankings between 6 and 7 are regarded as high levels of endorsement for the item; and a ranking of 1, 2 or 3 on an item as a low level of endorsement.

### 1. Strategies agencies have in place to benefit from Bushfire CRC research

The first three items assessed participant familiarity with their agency’s strategic plan; familiarity with the research outputs emerging from the Bushfire CRC, and the perceived alignment between agency strategic planning and the research outputs emerging from the CRC.



**Figure 1: Participant familiarity with the strategies their agency has in place to benefit from Bushfire CRC research**

There has been a consistently high level of familiarity with the agency’s strategic plan, indicating that the sampling approach taken has reached its intended target and has been stable across the three data points. In the 2014 sample there is once again a lower level of familiarity with the research outputs<sup>i</sup> as well as with the perception of the alignment between the agency’s strategic planning needs and the research outputs. This may be due to the various specialisations of Bushfire CRC research which only target particular problems which would represent sub-components of an agency’s business.

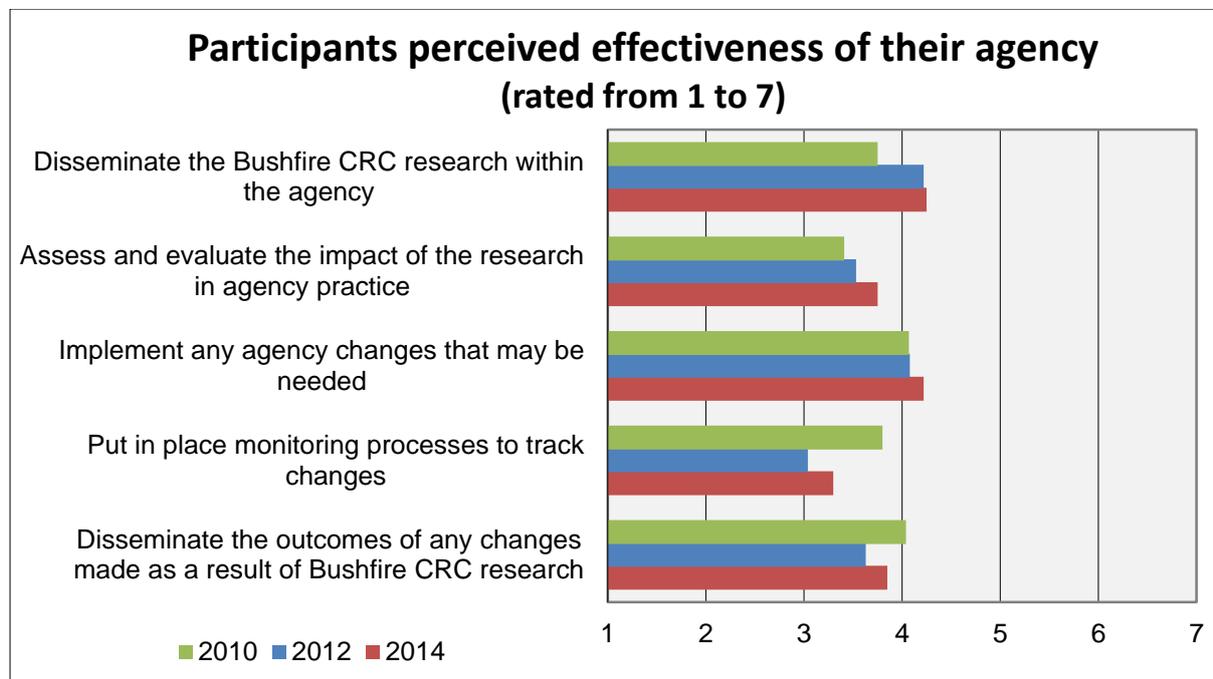
### Awareness of strategies to keep up to date with Bushfire CRC research

Participants were also asked to rank their level of awareness of the strategies their agency had in place to keep up to date with the Bushfire CRC research plan. The level of awareness has remained largely the same over the three data collection years.

### Perceived effectiveness of Bushfire CRC tools of research utilisation

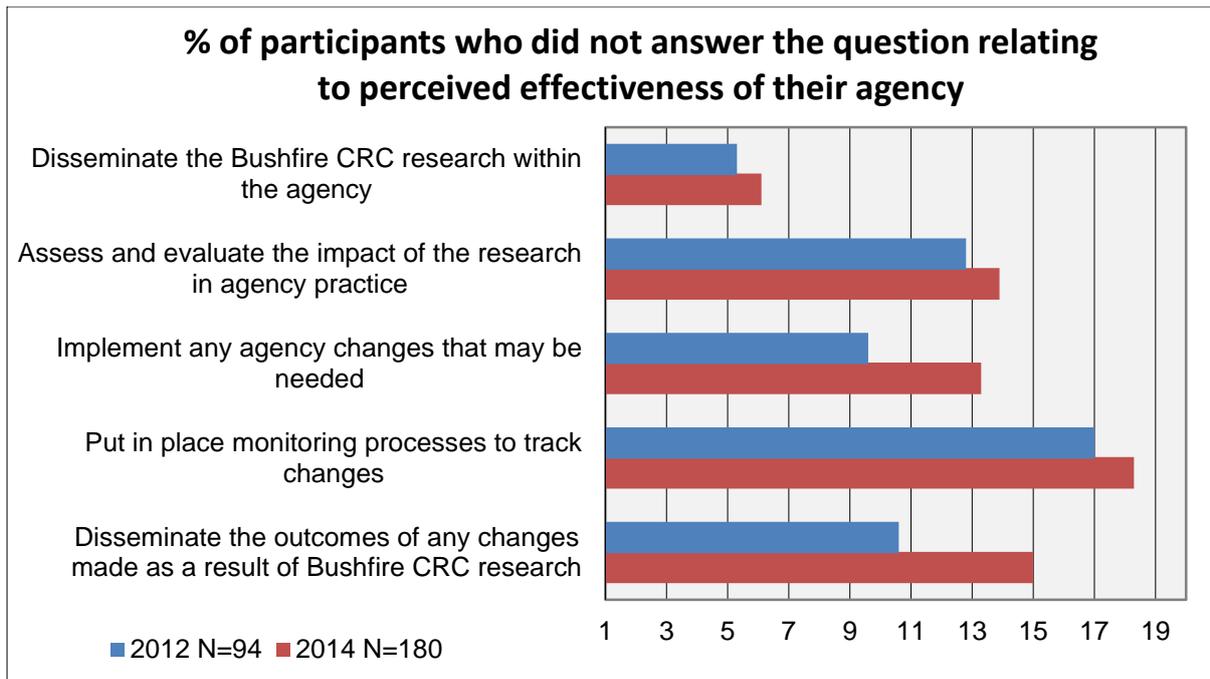
Participants were asked to rate the perceived effectiveness of their agency in terms of its processes to:

- **disseminate** the Bushfire CRC research within the agency;
- **assess and evaluate** the impact of the research in agency practice;
- **implement** any agency changes that may be needed;
- put in place **monitoring** processes to track changes; and
- **disseminate** the outcomes of any changes made as a result of Bushfire CRC research.



**Figure 2: Participants assessment of the effectiveness of their agency's strategies to benefit from Bushfire CRC research**

The above figure illustrates a trend towards improvement on all items, though none of these are statistically significant. The item “*put in place monitoring processes to track changes*” is worthy of note given it is the lowest ranked of all and has been low for the past two survey points. It is also interesting to plot the number of participants stating they could not answer the question, or skipped the question altogether (see Figure 3).



**Figure 3: Participants who chose “can’t answer” or skipped the question relating to their perceived effectiveness of their agency's strategies to benefit from Bushfire CRC research**

As can be seen there is more confidence about processes in place to disseminate both the research and any changes based on outcomes, and less confidence that there are agency practices in place to assess and evaluate the impact of the research and of processes in place to monitor changes. Since the item sought “can’t answer” rather than “non-applicable” it will be important in any future research utilisation strategy to further investigate the basis for this response. It may be that that staff in the agency do not feel it is their role and if this is the case, it will be important to demonstrate the value to the agency of assessing, evaluating and monitoring. Given the ways in which research outcomes have been employed in various Commissions of Inquiry into major Bushfire events, there is a strong case to argue for why it is in agency best interest to have these processes in place.

The responses for this item may also suggest that there is recognition that practices of assessment, evaluation and monitoring are not occurring and again this represents a risk for agencies and the industry as a whole. Participants were also asked to provide a comment on the ways in which their agency assessed and evaluated the impact of research. A review of these comments reveals that there is still some way to go within agencies in assessing and evaluating the impact of the research. Of the sample of 180, 79 (44%) chose to skip the question and of the 101 responses provided, 35 (19%) of participants commented “can’t answer, sorry”; “currently does not appear to”; “very quietly” or “we don’t”. A further 14 (8%) of participants commented that this occurs in an ad hoc or informal way. Of the 52 comments remaining the following practices were discerned:

- discussion at meeting;
- direct engagement in a research project;
- participation in research workshops;
- systematic review of research outputs against strategic plan and identified risks;
- process of peer review and in-house verification;

- specific roles with the responsibility to review and forward where relevant.

## 2. Uptake of Bushfire CRC research utilisation strategies

The next section asked participants to assess the tools and resources used by the Bushfire CRC to assist agencies to use the research. These resources include the Bushfire CRC Web Site, Fire Notes and Research Publications. In considering these tools and resources participants were asked to rate their level of satisfaction with using the tool to:

- become **familiar** with the Bushfire research;
- give them the **information** they want;
- assist them in learning new **knowledge** and **skills**;
- help them **understand** the CRC research;
- help them **evaluate** what needs to **change** in their agency's practice; and
- enables them to develop **skills** to help bring about **change**.

Figures comparing the three data cohorts are presented in Figure 4 to Figure 9. In summary:

- The results show a rising trend in increased levels of satisfaction with these research utilisation tools compared with 2010. The ratings for 2014, while slightly lower than that of 2012 are not statistically significantly different.
- It is also interesting to note that on most items the CRC website and publications items rank higher than Fire Notes did in 2010, indicating an increased level of acceptance and satisfaction with these utilisation tools since 2010.
- However, within the 2014 results, there are statistically significant different levels of satisfaction with the use of the research utilisation tools indicating they may be used for different purposes. Comparing how each participant responded to the different research utilisation tools reveals that:
  - Fire Notes have the highest levels of satisfaction for all utilisation purposes;
  - There is no difference between the website and other tools with gaining familiarity and getting needed information;
  - Research publications are rated more highly than the website in providing participants with needed information; helping to learn new knowledge and skills; evaluating what needs to change in practice and developing skills to help bring about change.
- **Overall and consistent across all three time periods, the items *skills to identify what needs to change* and *helping to bring about change* receive the lowest rankings compared with all other items.** That is, while the other items ranged in average between 4.2 and 5.5, these two change items ranged between 3.1 and 4.1.
- While developing expertise in identifying and enacting change is not the main focus of Bushfire CRC research, these skills are however critical to research utilisation. In future research utilisation initiatives it might be profitable to focus on developing agency capability and capacity to interpret and evaluate research findings in relation to organisational development and developing skill sets for addressing changes needed. Some insights in relation to agency concerns here are also discussed below in the barriers section.

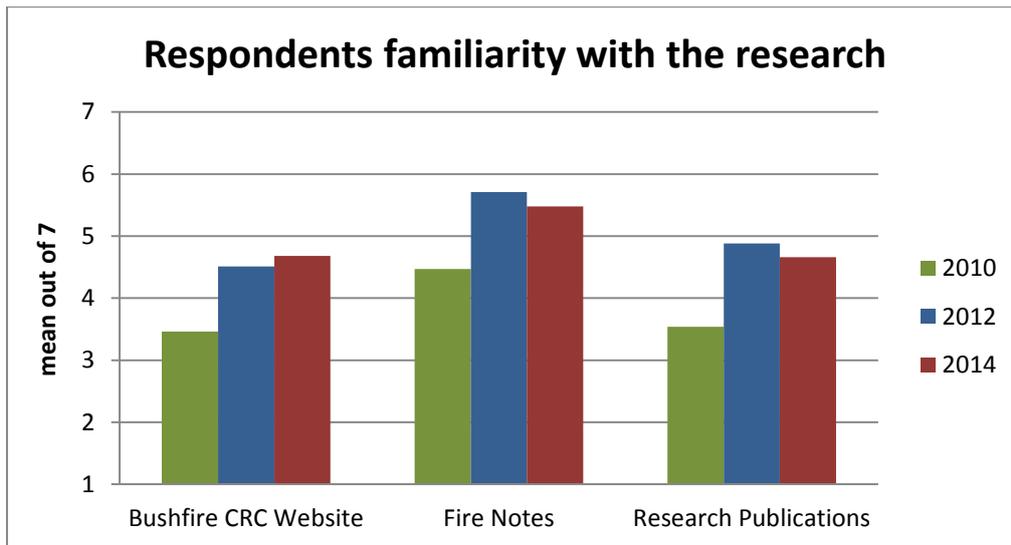


Figure 4: Participants level of familiarity with Bushfire CRC Research<sup>1</sup> through use of the Bushfire CRC research utilisation tools and resources

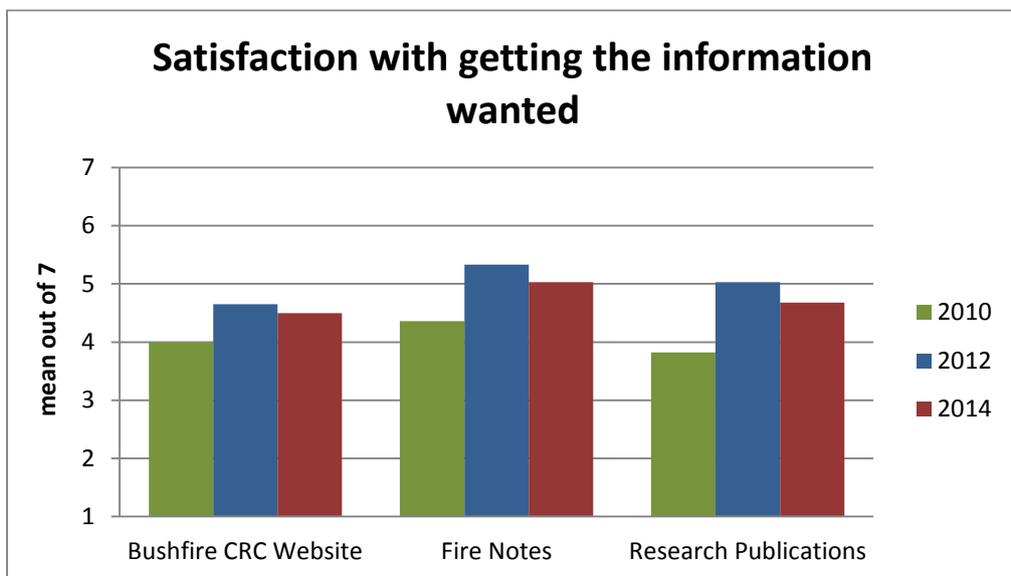
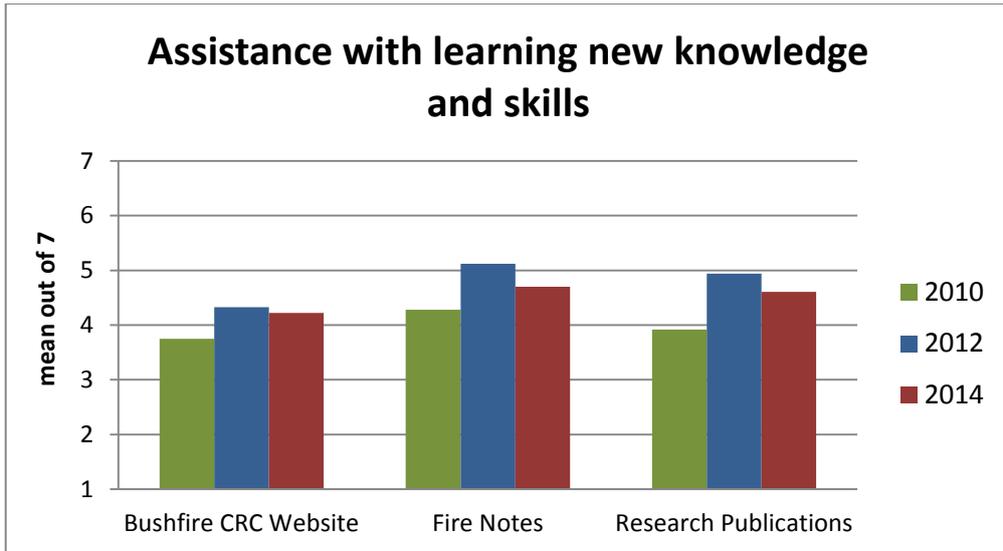
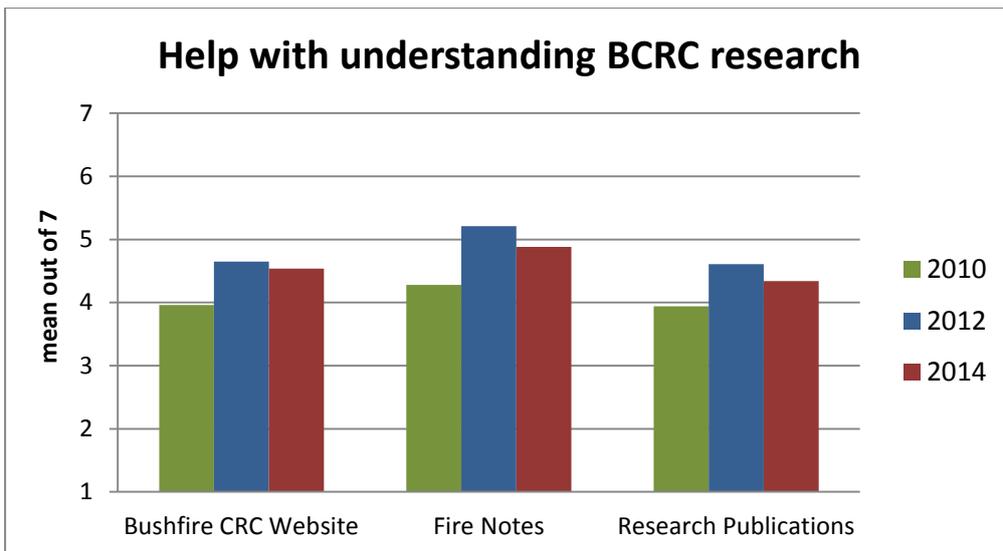


Figure 5: Participants level of satisfaction with getting the information they want from Bushfire CRC research utilisation tools and resources

<sup>1</sup> Slight difference in wording in the 2010 survey



**Figure 6: Participants rating of the level of assistance the Bushfire CRC research utilisation tools and resources provide in helping them acquire new knowledge and skills**



**Figure 7: Participants rating of the level of help the Bushfire CRC research utilisation tools and resources provide for them to understand Bushfire CRC research**

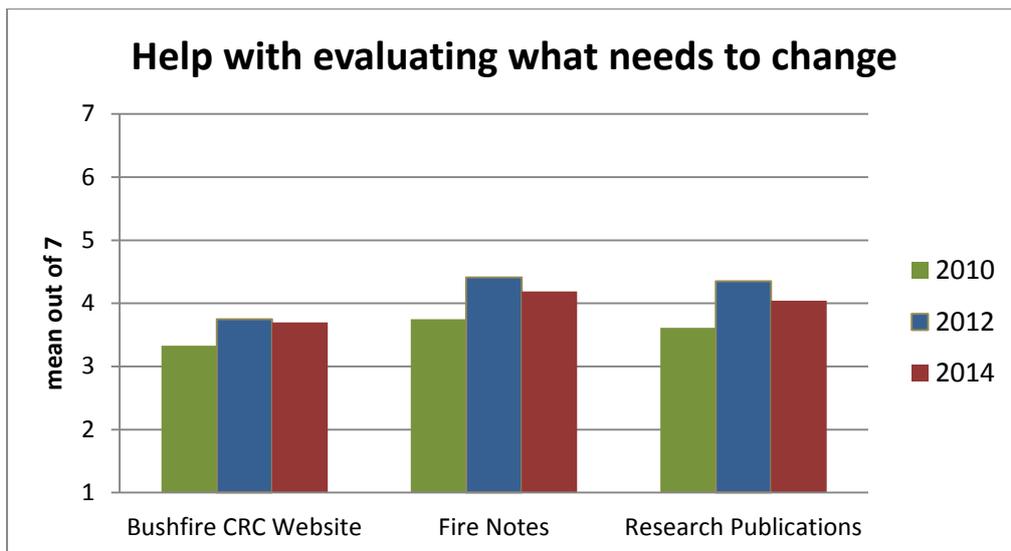


Figure 8: Participants rating of the level of help the Bushfire CRC research utilisation tools and resources provide for them to evaluate what needs to change in their agency's practice

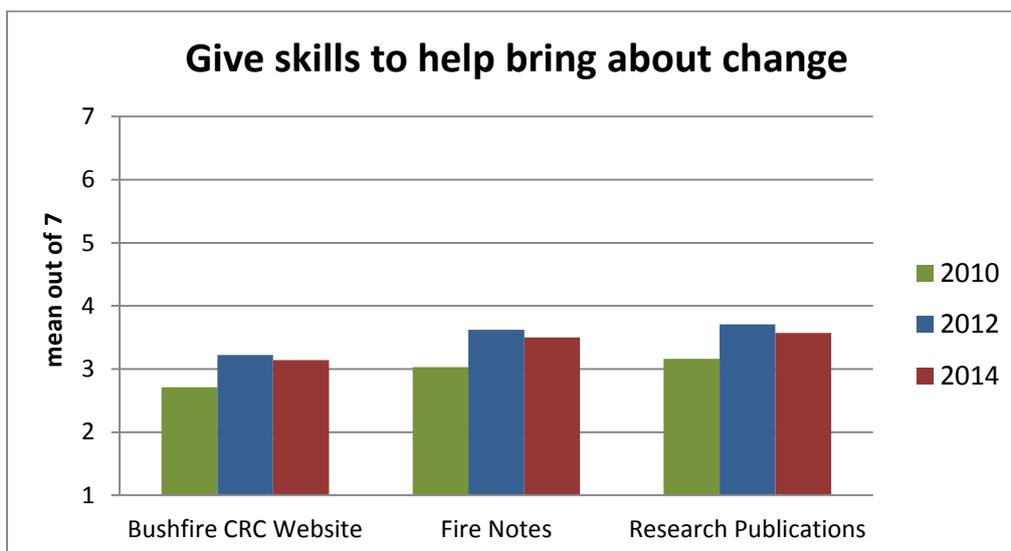


Figure 9: Participants rating of how well the Bushfire CRC research utilisation tools and resources give them the skills to help bring about change in their agency

### Engagement in Bushfire CRC research utilisation processes

Information was sought on involvement in collaborative opportunities to more actively engage with Bushfire CRC research and its utilisation activities, such as participation in:

- AFAC Conference Science Day;
- Bushfire CRC Research Advisory Forum;
- One-off workshops on specific topics; and
- Involvement in a project team.

Table 2 summarises the number of participants who are also engaged in these collaborative opportunities.

**Table 2: Number of participants engaged in collaborative opportunities**

Engagement	N	% of sample
<b>AFAC Conference Science Day</b>	66	37%
<b>Bushfire CRC Research Advisory Forum</b>	60	33%
<b>One-off workshops on specific topics</b>	89	49%
<b>Involvement in a project team</b>	52	29%

The table illustrates the highly engaged nature of the sample. It is also worth noting that 39 or 14% of respondents were engaged in just one collaborative opportunity; 20 (7%) were engaged in two collaborative activities, 13 (5%) in three and 37 (14%) participants in all four collaborative activities.

Participants who were engaged in each of these collaborative opportunities were also asked to report their levels of satisfaction with each collaborative activity in terms of the degree that it:

- enables you to become **familiar** with the Bushfire CRC research;
- gives you the **information** you want;
- assists you in learning **new knowledge** and **skills**;
- helps you to **understand** the CRC research;
- helps you to **evaluate** what needs to **change** in your agency's **practice**; and
- enables you to **develop** the **skills** to help bring about **change**.

The findings are indicated in Figure 10 to Figure 15. In summary the findings indicate that:

- All 2014 Bushfire CRC collaborative activities reported higher levels of perceived satisfaction than 2010.
- There are declines in levels of perceived satisfaction when compared with the 2012 sample. Many of these are likely due to sampling variation, though the Research Advisory Forum<sup>ii</sup> was rated statistically significantly lower<sup>2</sup> on the degree to which it provided:
  - information wanted
  - the ability to learn new knowledge and skills
  - assistance to participants to understand BCRC research, or
  - development of skills to bring about change.
- It is also interesting to note that as a collaborative opportunity, satisfaction with the Research Advisory Forum received the largest drop since 2012. This suggests there is a need to review how the RAF may better engage participants to achieve utilisation goals.
- The continued support for ongoing engagement through activities such as workshop and project teams indicates the value participants place on being able to be involved in a

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<sup>2</sup> Though the effects sizes are small

continuing dialogue about the meaning of the research which thus improves understanding and a capacity to act on utilisation for the agency.

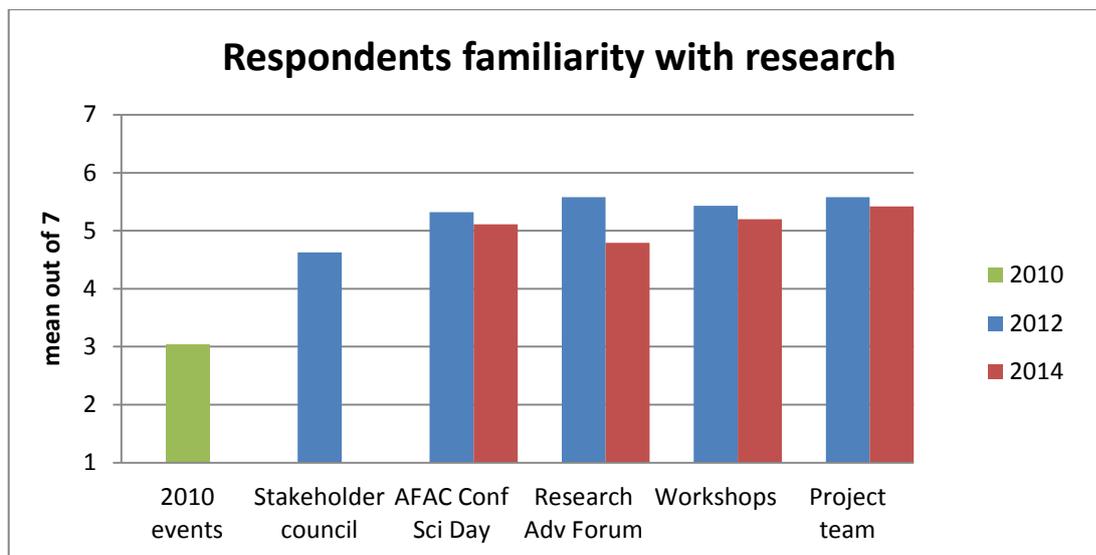


Figure 10: Participants rating of their familiarity with the research when engaged actively in collaborative Bushfire CRC opportunities

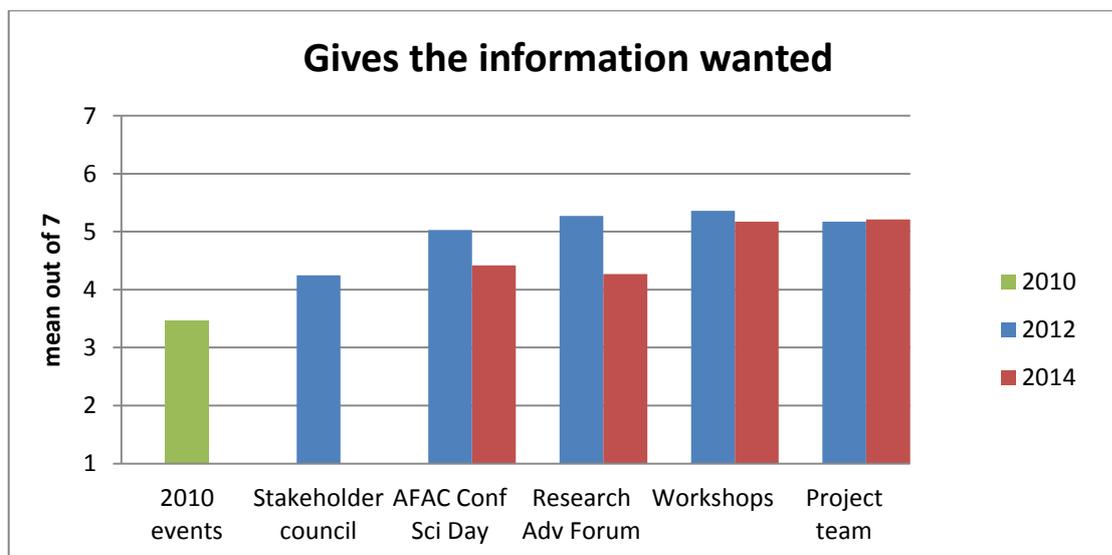


Figure 11: Participants level of satisfaction with getting the information they want research when engaged actively in collaborative Bushfire CRC opportunities

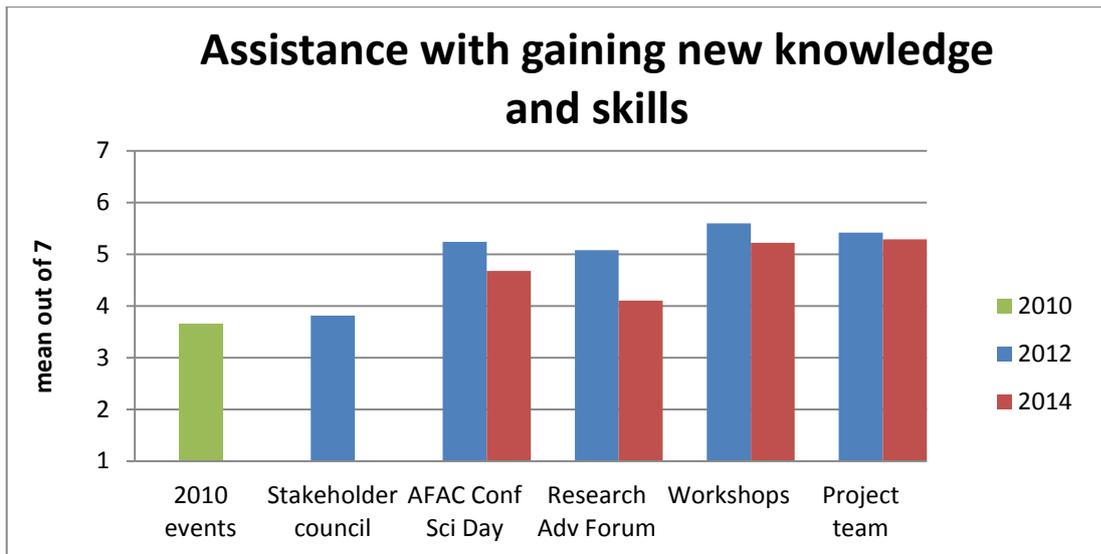


Figure 12: Participants rating of the level of assistance with learning new knowledge and skills when engaged actively in collaborative Bushfire CRC opportunities

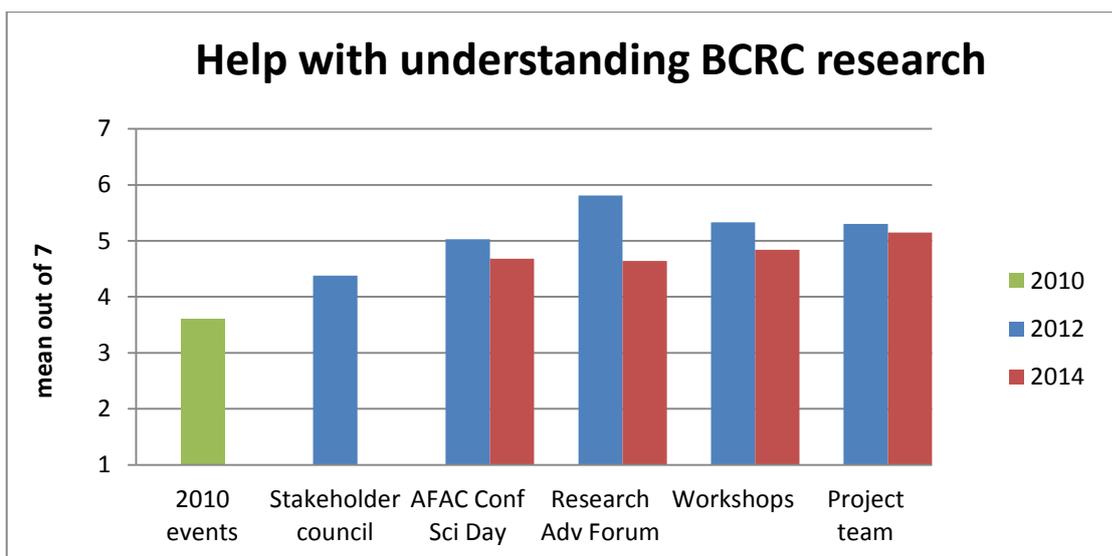
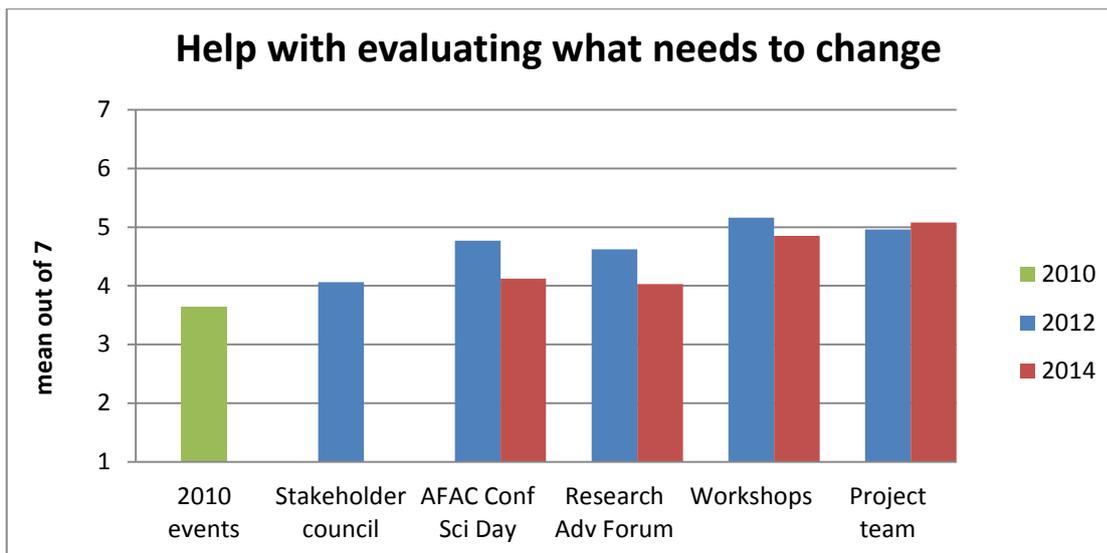
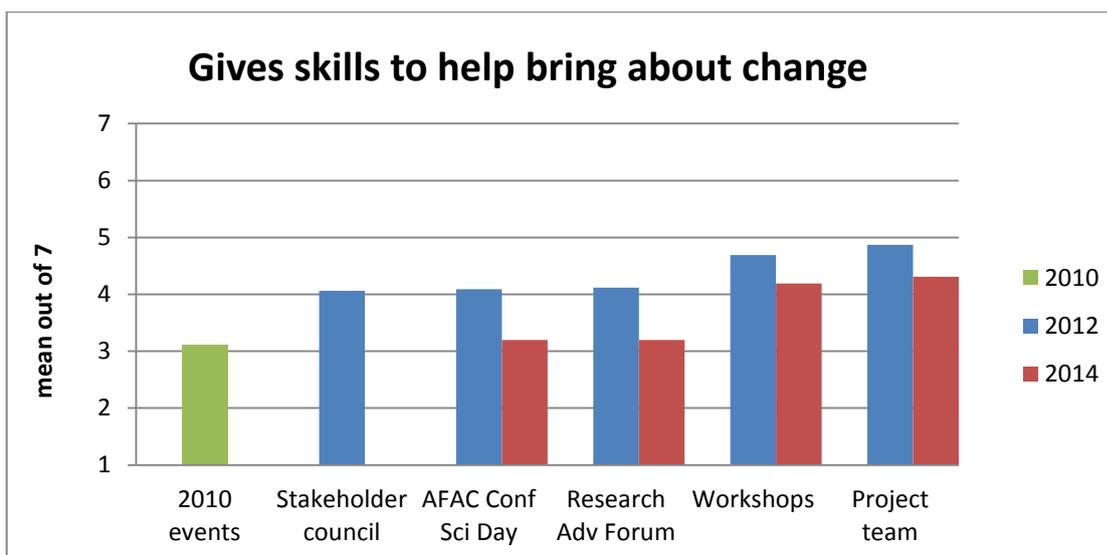


Figure 13: Participants rating their understanding of Bushfire CRC research when engaged actively in collaborative Bushfire CRC opportunities



**Figure 14: Participants rating of the level of help to evaluate what needs to change in their agency's practice when engaged actively in collaborative Bushfire CRC opportunities**



**Figure 15: Participants rating of how well they are able to develop the skills to help bring about change in their agency from being engaged actively in collaborative Bushfire CRC opportunities**

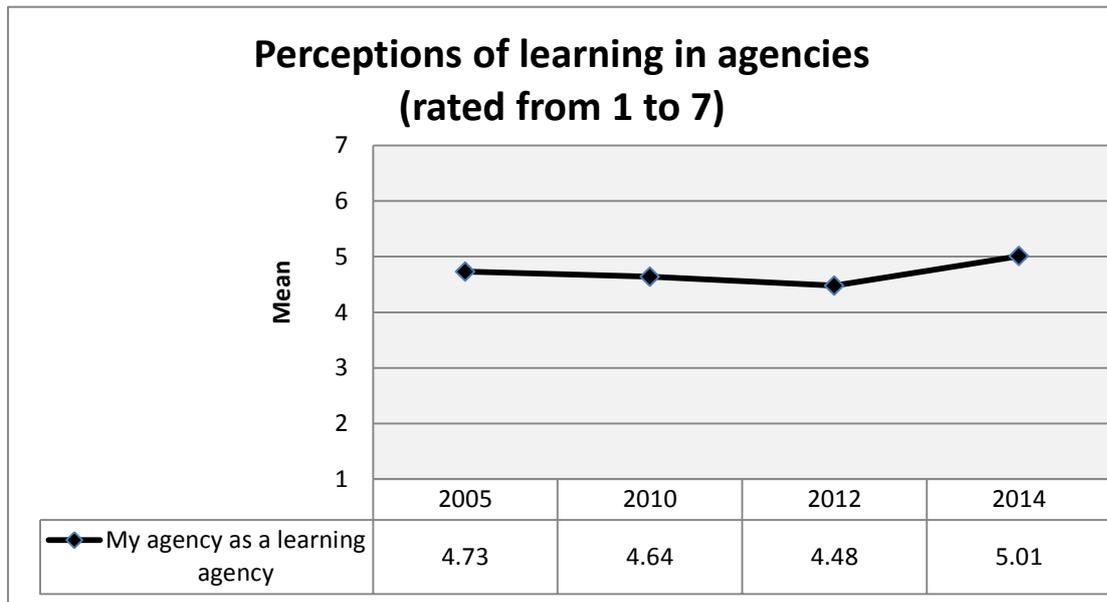
### Perceptions of learning cultures in agencies and in the industry

The 2014 survey again surveyed perceptions of the degree to which (i) the agency and (ii) the fire and emergency services industry could be characterised as having an emphasis on learning, where a learning culture was defined as an agency (industry) that learns from the experience of its own members or the experience of others. In the 2010 survey participants were also asked to report on where they thought the industry was five years previously. As can be seen from Figure 16 and Figure 17 perceptions of learning in agencies<sup>iii</sup> as well as in the industry<sup>iv</sup> have increased following a series of decline.

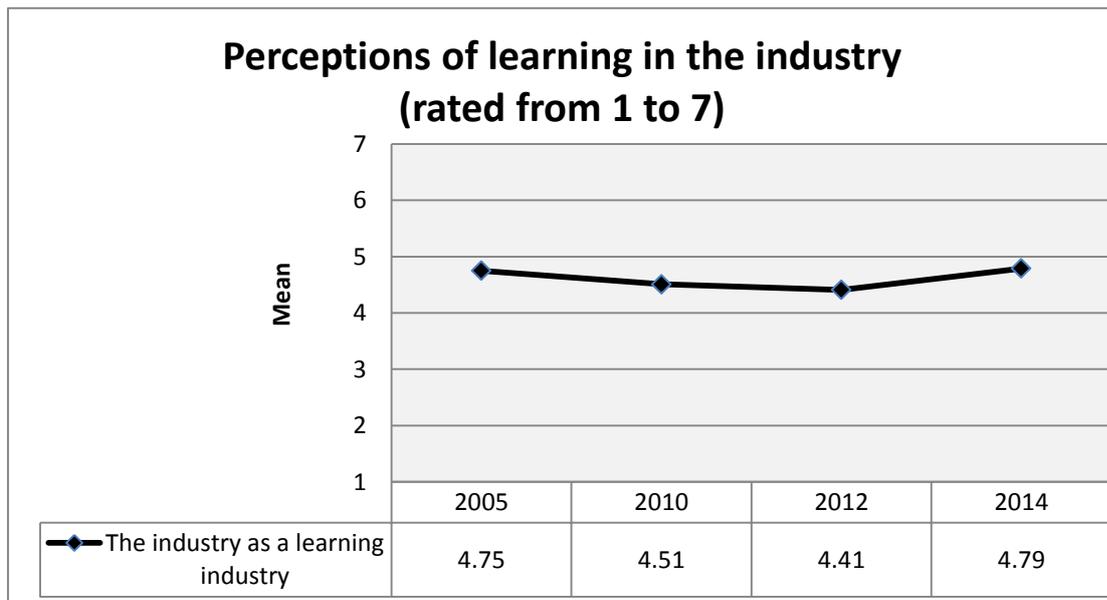
Given the importance of a learning culture to support adaptation, innovation and change within the industry, it would be important in the future to continue to take the “temperature” of the industry

in terms of how it perceives itself in terms of a learning culture. There may also be value in further examining aspects that enable or constrain a learning culture. The findings provide some insights but do not explore the attributes that would enable the development of a learning and innovation culture. Indeed while the findings are interesting, the current survey structure does not provide insights as to why these items have changed or whether there are differing patterns in segments within the industry.

Given the importance in the industry (including supporting resilience in the face of litigious scrutiny for agencies) to be able to demonstrate evidence-based practice and to enable responsiveness to change and agility, then a better understanding of learning cultures within the industry would seem critical.



**Figure 16: Mean of participants' rating from 1 to 7 of learning in their agency**



**Figure 17: Mean of participants' rating from 1 to 7 of learning in the industry**

The final section of the survey assessed barriers to research utilisation that have been identified in the research literature.

### 3. Barriers to research utilisation

Participants were also asked to provide an assessment of the degree to which key barriers might be impeding research utilisation. Previous responses indicated concerns about the capacity to assess and evaluate research impact for agency practice; to monitor changes based on research evidence; and about skills needed to initiate change. Thus, it was anticipated that a review of potential barriers to research utilisation may yield useful insights.

The 2010 survey included 28 items adapted from research undertaken in related domains (Baernholdt & Lang 2007; Funk, Champagne, Weise & Tornquist 1991; Retsas 2000; Hemsley-Brown & Oplatka 2005). Following a review of the items in a factor analysis, 15 items were retained and included in 2012 and these repeated in 2014. The highest scoring barriers are presented in Table 3 in rank order, across all three data points<sup>3</sup>.

Table 3 shows that there are consistent barriers identified across all three data points. The items that were included in the top five rankings in 2014 are:

- “The impacts of the research for the agency need to be better articulated”
- “We need cooperation from other stakeholders in the industry for successful implementation”.
- “As an agency we don't have an effective process for translating the research for our personnel”
- “We need a change advocate within the agency to take the implications forward”
- “The agency has not developed the appropriate assessment strategies to consider the implications of the research”

It is interesting that for the first time the item “*We need cooperation from other stakeholders in the industry for successful implementation*” was ranked second overall. Previously this item had emerged as important for a particular agency type (in the 2012 study it was ranked as 5<sup>th</sup> for people from land management agencies) but it had not featured in the top five overall.

A review of barriers identified was undertaken for people in different positions within their agency (senior management, middle management and front line), as well as for participants within different types of agencies. These indicate that both senior and middle managers are most concerned with the need to articulate the impact of the research as well as with a need for broader industry cooperation in utilising the research. Frontline personnel were also concerned with a need for broader cooperation and with the lack of awareness about the research findings.

For personnel involved in different agency types there were some differences reported<sup>v</sup>. This may offer some direction to where research utilisation initiatives may be targeted, at least in the first instance to develop exemplars that may be showcased.

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<sup>3</sup> One item included in the 2010 survey that was second overall “*there needs to be better linkages between researchers and practitioners*” was dropped

Table 3: Summary of barriers items and ranking for 2010-2014

List of Statements	2010	2012	2014
1. Implications for practice are not made clear			
2. The reports are hard to read			
3. Most people in this agency don't know about the research	4th	3rd	
4. Agency personnel don't have the capacity to think strategically about what the research may mean for our business			
5. There is too much change happening in this agency already, we don't need more to be considered			
6. It is not clear what change is needed			
7. We need a change advocate within the agency to take the implications forward		2nd	4th
8. The impacts of the research for the agency need to be better articulated	1st	1st	1st
9. We need cooperation from other stakeholders in the industry for successful implementation			2nd
10. The amount of research information is overwhelming			
11. Personnel don't feel capable of evaluating the quality of the research			
12. The research is hard to find			
13. It is not clear who is dealing with what Bushfire CRC research in our agency			
14. As an agency we don't have an effective process for translating the research for our personnel	3rd	5th	3rd
15. The agency hasn't developed the appropriate assessment strategies to consider implications of the research	5th	3rd	5th
<b>Total number of responses</b>	<b>148</b>	<b>94</b>	<b>180</b>

Participants from combined emergency services agencies (e.g., QFRS, DFES, TFS) were most concerned with making sense of research reports (*hard to read*), as well as with their capacity to strategically consider what the research may mean for their business.

Participants from rural agencies (e.g., CFS) found it more challenging to make sense of the plethora of research outputs (*research information is overwhelming*) and were also concerned with their capability to evaluate the quality of the research. Participants from land management agencies were most concerned with the amount of change occurring within their own agency and within their context. Finally participants from urban agencies (e.g., NSW Fire and Rescue) were most concerned with awareness within the agency of the research.

Utilisation opportunities might be targeted to assist, in the first instance, combined agencies with discussions about interpreting the research. They may have a particular interest in hosting forums and workshops to discuss big picture strategic issues and the implications of the research. This is also likely to be of interest to those from land management agencies.

Rural agencies may be approached with assistance in interpreting research outcomes. They might be targeted to sponsor workshops to develop criteria for evaluating research appropriate to their agency context and with developing strategies to organise the processing of research outputs. Urban agencies might be targeted to assist with trialling different processes of awareness and research dissemination.

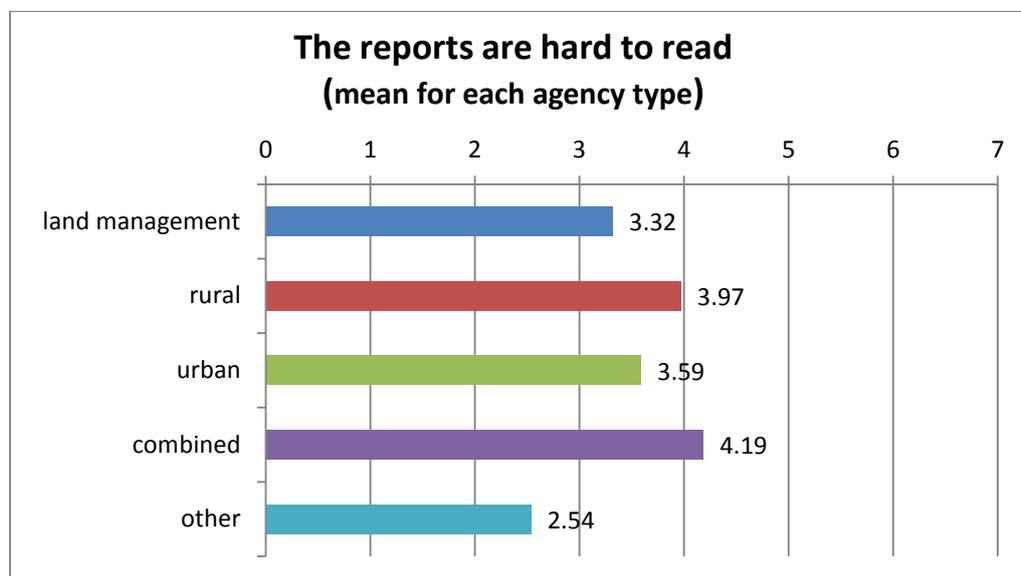


Figure 18: Means for agencies on the barrier “the research reports are hard to read”<sup>vi</sup>

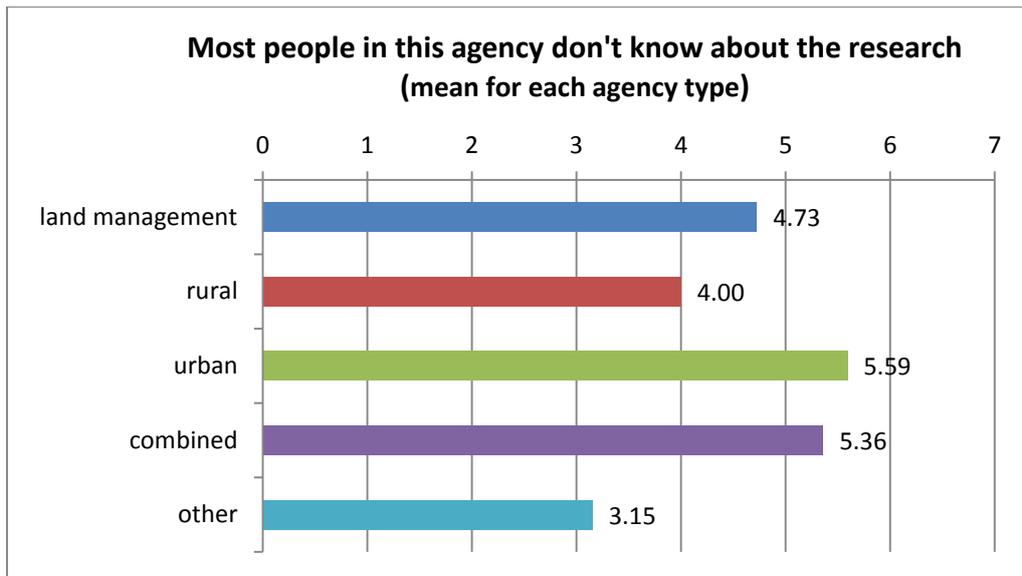


Figure 19: Means for agencies on the barrier “most people in this agency don't know about the research”<sup>vii</sup>

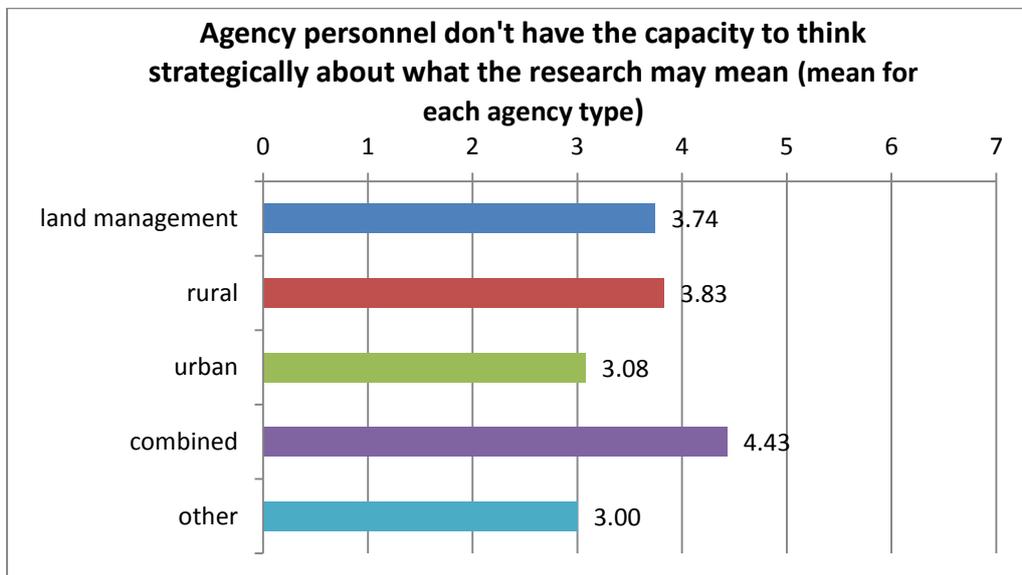


Figure 20: Means for agencies on the barrier “agency personnel don't have the capacity to think strategically about what the research may mean”<sup>viii</sup>

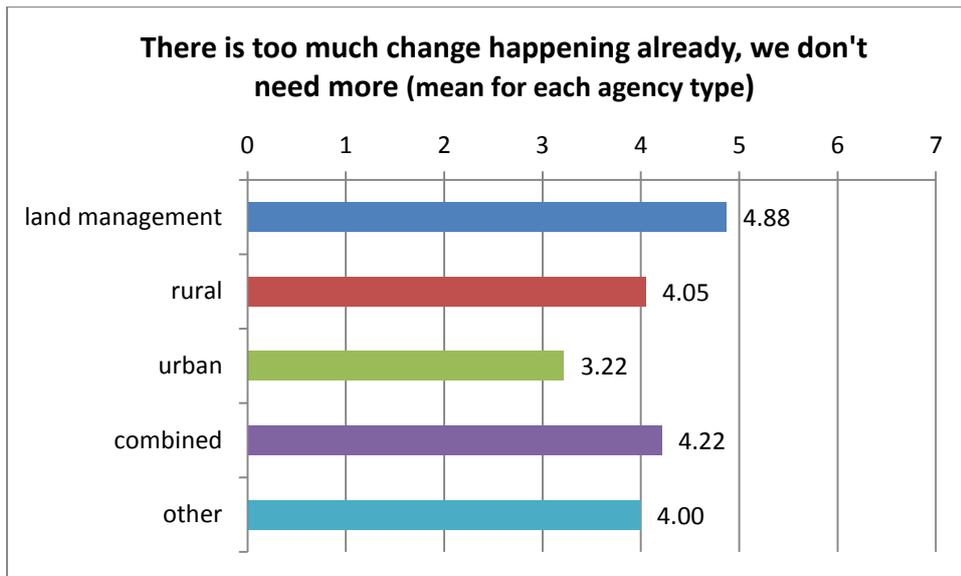


Figure 21: Means for agencies on the barrier *“there is too much change happening already, we don't need more”*<sup>ix</sup>

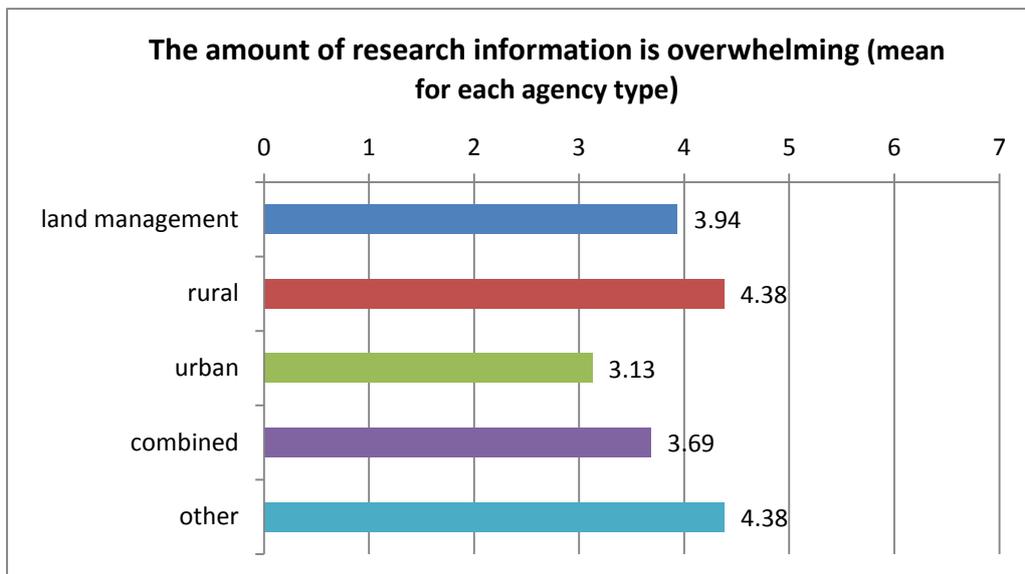


Figure 22: Mean for agency *“the amount of research information is overwhelming”*<sup>x</sup>

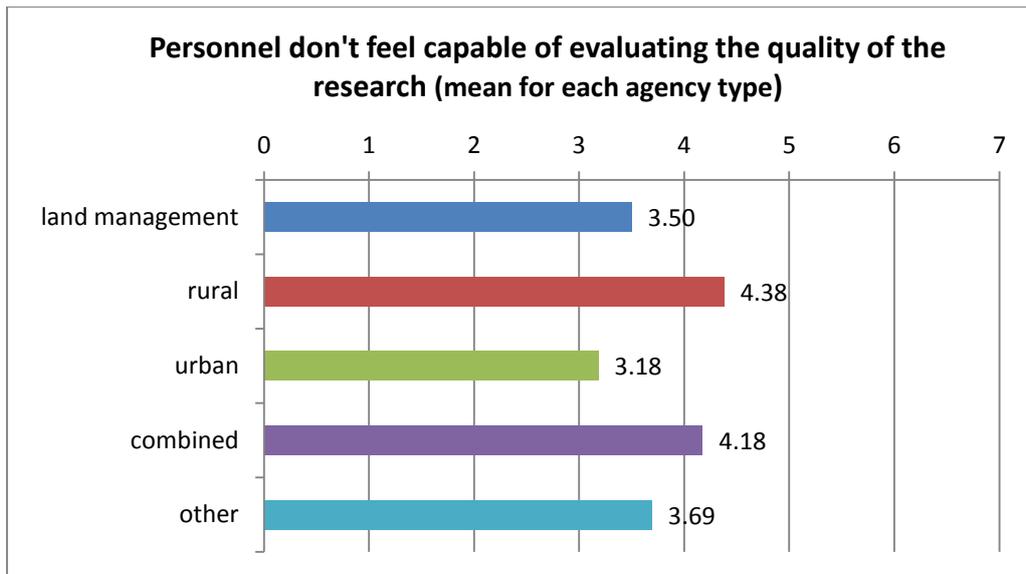


Figure 23: Means for agency “personnel don't feel capable of evaluating the quality of the research”<sup>xi</sup>

Table 3 also illustrated that there has been a consistency in perceived barriers to research utilisation over time. In order to understand if there is an underlying structure in the responses that might help provide direction to future utilisation initiatives, a statistical Factor Analysis was undertaken (see Attachment 1).

## Factor Analysis

Factor analysis is a powerful way to examine the structure of response patterns and to reduce data to ascertain if there are particular dimensions (factors) that help explain the way participants are responding in the survey and whether there is just one or multiple dimensions that might account for the variation in responses. Factor analysis can also measure the relative importance or “weight” given to the factor by responses. This can be helpful in identifying overarching areas for targeting. The analysis revealed that in responding to the 15 barriers items, four dimensions (and here grouped into three factors) could be identified. These included:

### Agency capability

The first and, by far, the factor given the most weighting in the response pattern relates to the internal processes agencies have in place to manage research utilisation in order to make sense of the research for their agency in their own environment. Items included in this factor include perceptions that agencies:

- do not have an effective process for translating the research;
- have not yet developed the appropriate assessment strategies to consider the implications of the research; and
- do not have in place clear processes for tracking who is dealing with what Bushfire CRC research within the agency.
-

## External context

The second factor relates to both the overwhelming amount of research emerging, and the broader context of change impacting on agencies. The feedback suggests that there is a need to build industry-wide cooperation, indicating that the problems to be tackled are larger than just one agency. In order to build that cooperation and take research utilisation forward and address the issues, there is a need to provide space for agency personnel to step back and think strategically and to develop particular roles within agencies. Items included in this factor include perceptions that:

- the amount of research information is overwhelming;
- we need cooperation from other stakeholders in the industry for successful implementation;
- there is too much change happening in this agency already, we don't need more to be considered;
- agency personnel don't have the capacity to think strategically about what the research may mean for our business; and
- we need a change advocate within the agency to take the research implications forward.

## Research Utilisation enablers

The third and fourth dimensions have been grouped into a third factor which relates to enablers supporting *Research Utilisation*. This indicates what agencies, peak bodies such as AFAC and the CRC can do to support sense making about the implications for research utilisation. These items include reference to:

- the research being hard to find;
- the impacts of the research for the agency needing to be better articulated; and
- implications for practice not being made clear.

However, it should also be noted that assessing the implications of research for practice is not an easy fix, as the implications will change for different agencies and even different parts of the agency. It is thus critical to acknowledge that developing a capacity to better understand the implications for practice will require significant effort and a nuanced approach.

In addition, these factors would seem to be precursors or enablers that in turn feed into *Agency Capability* and further agency capacity to develop and change, making the most of research insights.

When the factors were used to predict, through a regression analysis, perceptions of learning culture on (i) the home agency and (ii) the fire and emergency services industry, only the agency capability factor significantly predicted perceptions of a learning culture within the agency (see Attachment 1).

The results from the potential barriers to research utilisation section are interesting in that they provide insights into the challenges facing the fire and emergency services industry. The analysis suggests that for significant leverage from utilisation to occur there is a need to build agency and industry capability in assessment and evaluation of potential impacts, as well as in the translation process.

**Table 4: Barriers items grouped into dimensions**

Rotated Factor Matrix <sup>a</sup>				
	Factor			
	1	2	3	4
<b>Q9.14. As an agency we don't have an effective process for translating the research for our personnel</b>	.828			
<b>Q9.15. The agency hasn't developed the appropriate assessment strategies to consider the implications of the research</b>	.792			
<b>Q9.13. It is not clear who is dealing with what Bushfire CRC research in our agency</b>	.610			
<b>Q9.10. The amount of research information is overwhelming</b>		.632		
<b>Q9.9. We need cooperation from other stakeholders in the industry for successful implementation</b>		.589		
<b>Q9.5. There is too much change happening in this agency already, we don't need more to be considered</b>		.457		
<b>Q9.4. Agency personnel don't have the capacity to think strategically about what the research may mean for our business</b>		.436		
<b>Q9.7. We need a change advocate within the agency to take the research implications forward</b>	.410	.430		
<b>Q9.12. The research is hard to find</b>			.733	
<b>Q9.8. The impacts of the research for the agency need to be better articulated</b>			.474	
<b>Q9.1. Implications for practice are not made clear</b>				.985
Extraction Method: Maximum Likelihood.				
Rotation Method: Varimax with Kaiser Normalization. <sup>a</sup>				
a. Rotation converged in 6 iterations.				

## Conclusion

This report discusses findings based on a survey used to consult the industry on existing and potential research utilisation practices to inform future directions. The survey has now been conducted three times (2010, 2012 and 2014) enabling a time-series comparison. The review canvassed perceptions of research utilisation products as well as the experiences of those actively engaged in collaborative research review opportunities.

Feedback was received from a cohort of contributors who were from a representative sample of agencies and who were well qualified to answer. There was a high degree of familiarity with the agency's own strategic plan, and a reasonable degree of awareness of Bushfire CRC research outputs. The alignment between the agency's strategic planning and Bushfire CRC research outputs was slightly higher than that reported in 2010 and 2012.

Improvements have continued in the reported levels of satisfaction with utilising Bushfire CRC resources including the Bushfire CRC Web Site, Fire Notes and Research Publications. In addition, reported levels of familiarity with the research have also increased, along with satisfaction in using these information products to understand Bushfire CRC research.

Participants were also asked to rate their perceived effectiveness of their agency in terms of its processes to assess and evaluate the impact of research on practice; to implement any changes needed, and monitor processes to track changes. The perception of agency effectiveness in monitoring processes to track evidence-based change has dropped below the level reported in 2010 and remains the lowest of the items canvassed. This **indicates a gap in agency processes and a potential risk for the agencies concerned. It is important that agencies have in place processes of review, assessment and evaluation so that they can demonstrate evidence-based practice.**

Compared to the 2010 results, there has been a steady improvement in reported levels of satisfaction with utilising Bushfire CRC resources such as the Bushfire CRC Web Site, Fire Notes and Research Publications. Overall, and consistent across all three time periods, rankings for these resources providing the skills to *identify what needs to change* and to *help bring about change* are the lowest compared with all other items. These findings indicate that while the Fire Notes and Website play an important role, they are nevertheless limited in their capacity to support agencies to engage in research utilisation practices and need to be supplemented with more active engagement strategies.

In addition, the survey sought to assess the effectiveness of engagement in Bushfire research review opportunities (e.g., involvement in the AFAC conference Science Day, Research Advisory Forum, workshops), and the findings were positive. The Bushfire CRC research forum received the lowest scores for satisfaction on the degree to which it (i) *provided information wanted*; (ii) *provided the ability to learn new knowledge and skills*; (iii) *facilitated the understanding of the research* and (iv) *developed skills to bring about change*. The results also indicate that although the Research Advisory Forum may have a range of purposes, its perceived value in terms of its capacity to provide participants with information and understanding about the research has declined since 2010. Survey participants continue to support activities in which they are more deeply engaged, such as workshops and being members of a project team.

The 2014 survey again surveyed perceptions of the degree to which (i) the agency and (ii) the fire and emergency services industry could be characterised as having an emphasis on learning, where a learning culture was defined as an agency (industry) that learns from the experience of its own members or the experience of others. In the 2010 survey participants were also asked to report on where they thought the industry was five years previously, thus providing four time points for these two items. The 2014 study found that while perceptions about the learning culture (of the industry and of the participant's own agency) had been in decline for the first three time series points (2005, 2010, 2012) the 2014 report had improved.

Given the importance of a learning culture to support adaptation, innovation and change within the industry, it may be valuable in the future to continue to take the "temperature" of the industry in terms of how perceptions of a learning culture. Moreover, it may also be benefit to further examine aspects that enable or constrain a learning culture. The findings reported here provide some insights but do not explore the attributes that would enable the development of a learning and innovation culture. Indeed while the findings are interesting, the current survey structure does not provide insights as to why these items have changed or whether there are differing patterns in segments within the industry.

The findings suggest that information dissemination supports, such as the Bushfire CRC website and Fire Notes are now well accepted and embedded in agencies. These are necessary information provision tools but they are not sufficient to bring about research utilisation change. The types of activities where participants can be more deeply and continuously engaged, such as workshops and being a member of a project team, provide the highest levels of satisfaction, but these too, do not yet provide the necessary skills to enable assessment and evaluation of research and consideration of the research implication for agency and industry practice.

Participants were also asked to provide an assessment of the degree to which key barriers might be impeding research utilisation. Given the findings reported earlier indicating lower levels of confidence in agency capacity to assess and evaluate research impact for agency practice and to monitor changes based on research evidence – as well as concerns about skills needed to initiate change – it was anticipated that a review of potential barriers to research utilisation may yield useful insights. A Factor Analysis revealed that barriers to research utilisation were underpinned by three factors: (i) *Agency Capacity* to make sense of the research, indicating agencies need to develop more effective internal processes for translating the research and sense-making about implications particular to specific agency challenges; (ii) *External Context* which included the overwhelming amount of research outputs and the amount of change occurring in the industry, indicating a need to provide opportunities to step back and strategically consider the big picture. This suggests that peak bodies such as AFAC have strategic opportunities to add value and support to the industry. The third and fourth factors related to *Research Utilisation Enablers* and in this report have been combined into one factor that focusses on what agencies peak bodies such as AFAC and the CRC, can do to improve access to research and to support sense-making about the potential implications of the research for agencies and the industry.

There is a clear role for peak bodies such as AFAC in supporting consideration of strategic implications and in developing capacity to be able to assess, evaluate and bring about change where

needed. It is vital that agencies – and the industry – build capability in developing robust processes of deliberative review, assessment and evaluation so that evidence-based practice can be demonstrated.

Implications for future research from these findings suggest there is a need to tease out the elements that comprise learning and innovation cultures and what skills, processes and structures are needed. Further work is needed to better understand how perceived barriers can be overcome in order to increase and strengthen cultures of learning within agencies and the industry. Doing so will thus support goals of agility and innovation within the industry through utilisation, which include the acceleration of the pace of adoption, maximise the value of the research to the industry, and increase the worthiness of innovation.

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## Attachment 1: Statistical analyses

### Factor Analysis

A factor analysis was conducted using Maximum Likelihood estimation and Varimax (orthogonal) rotation, with factor loadings (weightings) above 0.30 visible, and with items sorted to reflect the relative strength of loadings per factor.

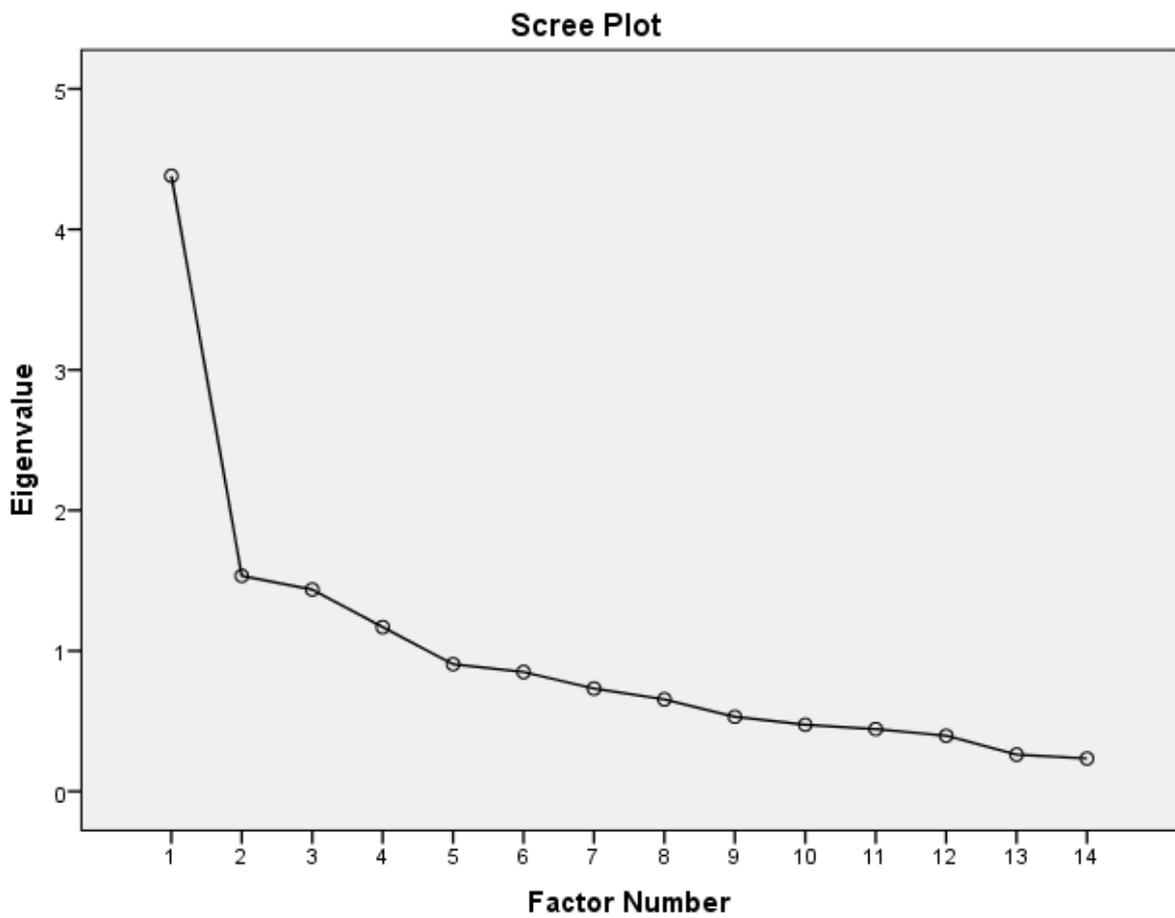
As a rule of thumb, a factor analysis is regarded as robust if it explains more than 50% of the variation of the correlations. Another measure of the robustness of the factors is the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO). Values less than 0.5 are regarded as unacceptable, values between 0.5 and 0.8 are acceptable and values of 0.8 and above are regarded as optimal.

The factor analysis conducted on the 15 *Barriers* items had a KMO measure of sampling adequacy of 0.767 and revealed four (4) factors accounting for 61% of the pattern variation in the responses thus providing a good explanation of the response patterns.

**Table 5: Factor Analysis Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.381	31.292	31.292	1.441	10.296	10.296
2	1.534	10.955	42.247	3.435	24.534	34.829
3	1.436	10.259	52.507	1.146	8.183	43.012
4	1.169	8.35	60.857	0.767	5.481	48.493
5	0.905	6.465	67.322	1.441	10.296	10.296

Table 6: Factor Analysis Scree plot



**Table 7: Rotated Factor Matrix<sup>a</sup>**

	Factor			
	1	2	3	4
Q9.14. As an agency we don't have an effective process for translating the research for our personnel	.828			
Q9.15. The agency hasn't developed the appropriate assessment strategies to consider the implications of the research	.792			
Q9.13. It is not clear who is dealing with what Bushfire CRC research in our agency	.610			
Q9.10. The amount of research information is overwhelming		.632		
Q9.9. We need cooperation from other stakeholders in the industry for successful implementation		.589		
Q9.5. There is too much change happening in this agency already, we don't need more to be considered		.457		
Q9.4. Agency personnel don't have the capacity to think strategically about what the research may mean for our business		.436		
Q9.7. We need a change advocate within the agency to take the research implications forward	.410	.430		
Q9.6. It is not clear what change is needed				
Q9.12. The research is hard to find			.733	

Q9.8. The impacts of the research for the agency need to be better articulated			.474	
Q9.2. The reports are hard to read				
Q9.11. Personnel don't feel capable of evaluating the quality of the research				
Q9.1. Implications for practice are not made clear				.985

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 6 iterations.

**Table 8: Factor Score Coefficient Matrix**

	Factor			
	1	2	3	4
Q9.1. Implications for practice are not made clear	-.040	-.208	-.003	1.001
Q9.2. The reports are hard to read	-.033	.041	.127	-.011
Q9.4. Agency personnel don't have the capacity to think strategically about what the research may mean for our business	.058	.207	-.167	.035
Q9.5. There is too much change happening in this agency already, we don't need more to be considered	-.025	.155	-.034	.018
Q9.6. It is not clear what change is needed	.002	.080	.089	-.006

Q9.7. We need a change advocate within the agency to take the research implications forward	.034	.139	.086	-.003
Q9.8. The impacts of the research for the agency need to be better articulated	-.029	.092	.188	-.016
Q9.9. We need cooperation from other stakeholders in the industry for successful implementation	-.032	.246	-.037	.026
Q9.10. The amount of research information is overwhelming	-.168	.359	.102	.026
Q9.11. Personnel don't feel capable of evaluating the quality of the research	-.005	.059	.080	-.006
Q9.12. The research is hard to find	-.044	-.135	.524	-.079
Q9.13. It is not clear who is dealing with what Bushfire CRC research in our agency	.168	-.160	.123	-.041
Q9.14. As an agency we don't have an effective process for translating the research for our personnel	.473	-.103	.028	-.045
Q9.15. The agency hasn't developed the appropriate assessment strategies to consider the implications of the research	.395	.102	-.209	.009

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

Factor Scores Method: Regression.

## Regression analyses

**Table 9: Regression Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.321 <sup>a</sup>	.103	.068	1.457	.103	2.907	4	101	.025

a. Predictors: (Constant), REGR factor score 4 for analysis 1, REGR factor score 1 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1

b. Dependent Variable: Q5.1 My home agency exemplifies a learning organisation (i.e. one that learns by experience -of its own members or the experience of others)

**Table 10: Regression Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	4.831	.141		34.145	.000		
REGR factor score 1 for analysis 1	-.502	.156	-.305	-3.212	.002	.986	1.014
1 REGR factor score 2 for analysis 1	-.113	.170	-.063	-.666	.507	.978	1.022
REGR factor score 3 for analysis 1	.157	.174	.086	.900	.370	.980	1.021
REGR factor score 4 for analysis 1	.034	.143	.022	.237	.813	.994	1.006

a. Dependent Variable: Q5.1 My home agency exemplifies a learning organisation (i.e. one that learns by experience -of its own members or the experience of others)

**Table 11: Regression Collinearity Diagnostics<sup>a</sup>**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	REGR factor score 1 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 3 for analysis 1	REGR factor score 4 for analysis 1
1	1	1.188	1.000	.00	.25	.29	.29	.00
	2	1.037	1.070	.00	.00	.12	.08	.75
	3	1.000	1.090	.99	.00	.00	.00	.00
	4	.921	1.136	.00	.73	.09	.25	.00
	5	.853	1.180	.00	.02	.50	.39	.24

a. Dependent Variable: Q5.1 My home agency exemplifies a learning organisation (i.e. one that learns by experience - of its own members or the experience of others)

**Table 12: Regression Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.75	5.96	4.83	.485	106
Residual	-3.541	2.708	.000	1.429	106
Std. Predicted Value	-2.229	2.337	.000	1.000	106
Std. Residual	-2.431	1.859	.000	.981	106

a. Dependent Variable: Q5.1 My home agency exemplifies a learning organisation (i.e. one that learns by experience - of its own members or the experience of others)

## Notes

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<sup>i</sup> Strat plan familiarity (M= 5.54, SE = .120); familiarity BCRC res outputs (M =4.17, SE = .127), ( $t(174) = 9.737$ ,  $p < .0005$ ,  $r = .59$ )

<sup>ii</sup> "gives you the information you want" [ $F(1,84) = 7.70$ ,  $p=.007$ ,  $\omega = .29$ ]; "assists you to learn new knowledge and skills" [ $F(1,85) = 6.89$ ,  $p=.01$ ,  $\omega = .27$ ]; "Helps you understand Bushfire CRC research" [ $F(1,83) = 8.39$ ,  $p=.005$ ,  $\omega = .30$ ]; "Gives you the skills to help bring about change" [ $F(1,83) = 5.51$ ,  $p=.021$ ,  $\omega = .26$ ].

<sup>iii</sup> Analysis of Variance between groups ( $F(1, 261) = 7.173$ ,  $p < .008$ ,  $\omega = .16$ ).

<sup>iv</sup> Analysis of Variance between groups ( $F(1, 249) = 4.074$ ,  $p < .045$ ,  $\omega = .13$ ).

<sup>v</sup> Analysis of variance are below

<sup>vi</sup> *The reports are hard to read*  $F(4,135) = 3.48$ ,  $p=.010$ ,  $\omega = .30$ .

<sup>vii</sup> *Most people don't know about the research*  $F(4, 143) = 6.693$ ,  $p=.001$ ,  $\omega = .39$ .

<sup>viii</sup> *Agency personnel don't have the capacity to think strategically about what the research may mean*  $F(4,135) = 2.637$ ,  $p=.020$ ,  $\omega = .27$ .

<sup>ix</sup> *There is too much change happening already, we don't need more*  $F(4,141) = 3.011$ ,  $p=.020$ ,  $\omega = .28$ .

<sup>x</sup> *The amount of research information is overwhelming*  $F(4,136) = 2.592$ ,  $p=.039$ ,  $\omega = .27$ .

<sup>xi</sup> *Personnel don't feel capable of evaluating the quality of the research*  $F(4,133) = 2.629$ ,  $p=.037$ ,  $\omega = .275$