Supplementary material

Exploring the use of economic evaluation in Australian wildland fire management decision-making

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Figure label	Ouestionnaire statement and items
	In bushfire management decisions, what is your personal perspective on how important the following considerations are compared to
Fig. 3	minimising the costs of bushfire management ^A
Political ramifications	minimising negative political ramifications of management decisions is
Social equity	minimising social equity and hardship from the effects of bushfire is
Community expectations	meeting community expectations for protection from bushfire is
Government policy	meeting government policy directives is
Health impacts	reducing health impacts of bushfire management activities is
Community safety	prioritising community lives and safety is
Fire-fighter safety	ensuring fire-fighter safety is
	If you were required to recommend whether or not to invest public (agency) funds in a management action or new equipment to reduce
Fig. 4	the risk of bushfire to private homes, how much would the following influence your recommendation? ^B
House market value	The market value of the homes at risk from bushfire
Community expectations	Community expectations for protection of homes
Budget impact	Overall impact of the investment on the bushfire budget available
Trade-offs	Expected losses incurred as a result of diverting investment away from the protection of other assets of value (e.g. water catchments,
	biodiversity, public infrastructure)
Management effectiveness	Confidence in the extent to which the management action/technology would reduce the bushfire risk to the assets
Cost-effectiveness	Cost-effectiveness of the bushfire management activity or equipment
	How helpful do you think each of the following would be in encouraging more use of economic evaluation in bushfire management
Fig. 5	decision making in your organisation?
Policy support	Policy that makes the use of economic evaluation a requirement for guiding bushfire management decisions
Access to economists	Greater access to economists working with our organisation to help evaluate our bushfire management decisions
Flexibility in budget	More say in how my agency allocates budget across different bushfire management activities or technologies
Research funding	Increased research funding for economic evaluation of bushfire management decisions
I raining in economics	More industry-wide training in economic evaluation for bushfire management
I raining in risk analysis	Increased training in risk analysis
Access to results	Better access to the results from economic evaluation studies
Direct benefits	Economic evaluation studies that can snow direct benefit to my agency (e.g. supporting increased budget allocations or reduced costs of
	operations)
Fig. 6	now much of a burrier ao you mink each of the following are in using economic evaluation to guide bushfire management decisions in
Fig. 0	<i>your organisation:</i> I imited understanding of what assets the community values the most means it is hard to prioritise hushfire management
Insufficient time	When making bushfire management decisions there is not enough time to take account of the most cost efficient use of recourses
Budget limitations	when making busine management decisions mere is not chough time to take account of the most cost-efficient use of resources Bushfire management budgets are so tight that changes in management strategies cannot be considered even if they were to offer greater
Budget miniations	value-for-money
Legal liability	Legal liability concerns that limit the flexibility of bushfire management decision-makers to use resources cost-effectively (See

Table S1. Questionnaire statements and items relevant to Figs 3–6

Figure label	Questionnaire statement and items
	definition of 'cost-effectiveness' below)
Government directives	Government directives that limit the flexibility of bushfire management decision-makers to use resources cost-effectively (See definition
	of 'cost-effectiveness' below)
Unrealistic results	The assumptions made in economic evaluation studies which means the results are often not realistic
Political considerations	Taking account of political considerations in bushfire management decisions limits the flexibility of bushfire management decision-
	makers to use resources cost-effectively
Community expectations	Meeting community expectations for bushfire suppression makes it hard to consider other bushfire management priorities
Lack of expertise	Lack of expertise and knowledge about economic evaluation

^AA 7-point Likert scale was used where 1 = Significantly *less* important and 7 = Significantly *more* important.

^BA 7-point Likert scale was used where 1 = Not at all influential and 7 = Highly influential.

^CA 7-point Likert scale was used where 1 = Not at all helpful and 7 = Very helpful.

^DA 7-point Likert scale was used where 1 = Not at all a barrier and 7 = Significant barrier.

Table S2. Correlation details between various survey questions

Indicating (where relevant) Kruskal Wallis H statistic (*H*), Spearman's *rho* (r_s), level of statistical significance (*P*), and number of responses (n). Correlations significant at *P* < 0.05 are indicated in bold. Relevant figures and tables from the main text are indicated. Correlations are significant at: *, < 0.05; **, < 0.01.

See Table S1 for full explication of survey question statements and individual item

	Role	Organisation	Formal training	Informal training	Familiarity ^A	Use ^B	Support ^C	Usefulness ^D
	<i>H, P,</i> n	<i>H, P,</i> n	<i>H, P,</i> n	<i>H, P,</i> n	<i>r_{s,} P,</i> n	<i>r_{s,} P,</i> n	<i>r_{s,} P</i> , n	<i>r_{s,} P,</i> n
Familiarity with economic	0.66, 0.72, 58	0.87, 0.65, 58	2.12, 0.12, 58	2.59, 0.11, 56	_	0.37**, 0.00, 59	_	0.20, 0.13, 58
evaluation techniques ^A (Fig.								
2)								
Use of economic evaluation	3.57, 0.17, 58	0.33, 0.85, 58	0.70, 0.40, 59	1.80, 0.18, 56	0.37**, 0.00, 59		0.63**, 0.00, 59	0.08, 0.57, 58
techniques ^B (Table 4)								
Support for economic	1.81, 0.40, 58	1.43, 0.49, 58	—	-	0.21, 0.10, 59	0.63**, 0.00, 59	—	-0.00, 0.99, 58
evaluation techniques ^C								
(Table 4)								
Usefulness of economic	0.85, 0.66, 58	2.64, 0.27, 58	0.47, 0.49, 58	0.06, 0.81, 56	0.20, 0.13, 58	0.08, 0.57, 58	0.00, 1.00, 58	—
evaluation techniques ^D								
(Table 4)								
Questions presented in Fig. 3								
Social equity	8.35*, 0.02, 54	1.70, 0.43, 54	0.41, 0.52, 54	0.00, 1.00, 52	0.10, 0.480 54	0.10, 0.48, 54	0.06, 0.67, 54	0.16, 0.24, 54
Community expectations	0.32, 0.85, 55	2.31, 0.32, 55	0.09, 0.77, 55	3.44, 0.06, 53	0.16, 0.26, 55	0.08, 0.56, 55	0.19, 0.17, 55	0.08, 0.54, 55
Community safety	1.21, 0.55, 58	3.25, 0.20, 58	0.10, 0.76, 58	0.92, 0.34, 56	-0.09, 0.49, 58	-0.02, 0.89, 58	-0.02, 0.88, 58	-0.17, 0.22, 58
Political ramifications	5.12, 0.08, 58	5.35, 0.07, 58	0.34, 0.56, 58	0.86, 0.35, 56	0.13, 0.34, 58	0.04, 0.77, 58	0.04, 0.76, 58	0.15, 0.25, 58
Health impacts	1.24, 0.54, 57	5.67, 0.06, 57	0.00, 0.97, 57	0.21, 0.64, 55	-0.04, 0.78, 57	0.01, 0.92, 57	-0.14, 0.32, 57	0.23, 0.09, 57
Fire-fighter safety	1.54, 0.46, 57	8.70**, 0.01, 57	0.02, 0.89, 57	1.60, 0.21, 55	-0.23, 0.09, 57	-0.03, 0.83, 57	-0.12, 0.39, 57	-0.16, 0.24, 57
Government policy	0.08, 0.96, 58	1.05, 0.59, 58	2.17, 0.14, 58	0.22, 0.64, 56	0.05, 0.73, 58	-0.17, 0.20, 58	0.08, 0.53, 58	0.05, 0.72, 58
Questions presented in Fig. 4								
Management effectiveness	0.95, 0.62, 57	1.35, 0.51, 57	2.96, 0.09, 57	0.36, 0.55, 55	-0.03, 0.82, 57	-0.26, 0.05, 57	-0.15, 0.27, 57	0.36**, 0.01, 57
Trade-offs	1.83, 0.40, 57	5.60, 0.06, 57	2.80, 0.10, 57	1.70, 0.19, 55	-0.06, 0.69, 57	-0.04, 0.79, 57	-0.13, 0.33, 57	0.34**, 0.01, 57
Budget impact	0.39, 0.82, 57	1.72, 0.42, 57	0.27, 0.60, 57	1.89, 0.17, 55	-0.07, 0.63, 57	-0.19, 0.17, 57	-0.25, 0.06, 57	0.12, 0.39, 57
Cost-effectiveness	3.21, 0.20, 57	2.74, 0.25, 57	0.02, 0.88, 57	3.91*, 0.05, 55	0.08, 0.55, 57	-0.20, 0.14, 57	-0.23, 0.09, 57	0.24, 0.07, 57
Community expectations	2.40, 0.30, 57	0.08, 0.96, 57	0.01, 0.93, 57	0.13, 0.72, 55	0.09, 0.51, 57	0.20, 0.13, 57	0.25, 0.06, 57	0.15, 0.28, 57
House market value	1.36, 0.51, 57	2.51, 0.29, 57	1.18, 0.28, 57	0.10, 0.76, 55	-0.01, 0.97, 57	0.03, 0.85, 57	-0.06, 0.66, 57	-0.13, 0.35, 57

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	Role	Organisation	Formal training	Informal training	Familiarity ^A	Use ^B	Support ^C	Usefulness ^D
					D	D	D	D
	<i>H, P,</i> n	<i>H, P,</i> n	<i>H</i> , <i>P</i> , n	<i>H, P,</i> n	$r_{s} P$, n	$r_{s} P$, n	$r_{s} P$, n	$r_{s,}P$, n
Questions presented in Fig. 5								
Training in economics	1.92, 0.38, 57	4.10, 0.13, 57	1.73, 0.19, 57	0.02, 0.89, 55	-0.11, 0.40, 57	-0.04, 0.76, 57	-0.19, 0.16, 57	0.30*, 0.02, 57
Access to economists	0.22, 0.90, 57	1.42, 0.49, 57	0.49, 0.48, 57	1.20, 0.27, 55	0.18, 0.19, 57	0.04, .075, 57	0.11, 0.41, 57	0.47**, 0.00, 57
Policy support	0.63, 0.73, 55	0.67, 0.71, 55	0.04, 0.85, 55	0.04, 0.85, 53	-0.06, 0.66, 55	-0.23, 0.09, 55	-0.16, 0.25, 55	0.31*, 0.02, 55
Research funding	0.16, 0.92, 57	1.09, 0.58, 57	0.25, 0.62, 57	0.70, 0.40, 55	0.22, 0.11, 57	0.07, 0.61, 57	0.15, 0.26, 57	0.46**, 0.00, 57
Direct benefit	6.62*, 0.04, 57	4.21, 0.12, 57	0.60, 0.44, 57	0.95, 0.33, 56	-0.13, 0.35, 57	-0.17, 0.20, 27	-0.14, 0.30, 57	0.34**, 0.01, 57
Access to the results	5.44, 0.06, 56	0.56, 0.76, 56	1.72, 0.19, 56	0.66, 0.42, 54	0.01, 0.93, 56	-0.09, 0.49, 56	-0.13, 0.35, 56	0.40**, 0.00, 56
Flexibility in budget	1.52, 0.47, 56	1.14, 0.57, 56	0.02, 0.90, 56	1.15, 0.28, 54	-0.09, 0.53, 56	0.15, 0.27, 56	0.01, 0.94, 56	0.10, 0.48, 56
Training in risk analysis	0.36, 0.83, 56	3.22, 0.20, 56	0.17, 0.68, 56	4.63*, 0.03, 54	-0.19, 0.16, 56	0.05, 0.69, 56	0.15, 0.28, 56	0.24, 0.07, 56
Questions presented in Fig. 6								
Unrealistic results	0.16, 0.93, 56	1.88, 0.39, 56	0.26, 0.61, 56	5.80*, 0.02, 54	-0.14, 0.31, 56	-0.12, 0.39, 56	-0.11, 0.43, 56	0.23, 0.09, 56
Lack of expertise	3.34, 0.19, 48	1.36, 0.51, 48	2.55, 0.11, 48	1.05, 0.31, 47	0.07, 0.63, 48	0.14, 0.34, 48	0.04, 0.77, 48	0.18, 0.22, 48
Legal liability	8.65**, 0.01, 51	2.02, 0.36, 51	0.87, 0.35, 51	0.01, 0.94, 49	-0.12, 0.41, 51	0.16, 0.26, 51	-0.09, 0.53, 51	0.16, 0.26, 51
Government directives	1.04, 0.59, 56	1.22, 0.55, 56	0.96, 0.33, 56	0.11, 0.73, 54	-0.11, 0.40, 56	0.09, 0.50, 56	-0.06, 0.65, 56	-0.02, 0.90, 56
Budget limitations	1.20, 0.55, 53	0.13, 0.94, 53	0.72, 0.40, 53	0.44, 0.51, 52	0.01, 0.95, 53	0.25, 0.07, 53	0.18, 0.21, 53	0.15, 0.29, 53
Political considerations	3.42, 0.18, 54	1.62, 0.45, 54	2.43, 0.12, 54	0.17, 0.68, 52	0.12, 0.40, 54	0.12, 0.39, 54	-0.10, 0.47, 54	0.10, 0.45, 54
Community expectations	0.68, 0.71, 55	0.26, 0.88, 55	1.79, 0.18, 55	0.03, 0.86, 53	0.09, 0.51, 55	0.07, 0.64, 55	0.02, 0.88, 55	0.06, 0.67, 55
Insufficient time	2.86, 0.24, 54	10.30*, 0.01, 54	0.46, 0.50, 54	0.01, 0.92, 52	-0.01, 0.96, 54	0.14, 0.30, 54	0.04, 0.76, 54	-0.13, 0.36, 54
Limited knowledge	3.09, 0.21, 55	1.24, 0.54, 55	0.52, 0.47, 55	0.00, 0.98, 53	0.06, 0.69, 55	0.15, 0.27, 55	0.20, 0.14, 55	0.10, 0.46, 55

^{A'}Familiarity' is the sum of all responses for each of the economic evaluation techniques, using a scale of 1 to 7, where 1 = not at all familiar, and 7 = highly familiar. There were 6 economic evaluation technique items, therefore the highest possible 'familiarity' score was 42. Fig. 2 includes each economic evaluation technique item asked.

^B·Use' is the sum of all responses for each of the economic evaluation techniques, using a scale of 1 to 7, where 1 = have never used, and 7 = have frequently used. There were 12 economic evaluation technique items, therefore the highest possible 'use' score was 84. Table 4 includes each economic evaluation technique item asked.

^C Support' is the sum of all responses for each of the economic evaluation techniques, using a scale of 1 to 7, where 1 = no support, and 7 = high-level support. There were 12 economic evaluation technique items, therefore the highest possible 'support' score was 84. Table 4 includes each economic evaluation technique item asked.

^D Usefulness' is the sum of all responses for each of the economic evaluation techniques, using a scale of 1 to 7, where 1 = little or no use, and 7 = highly useful. There were

16 economic evaluation technique items, therefore the highest possible 'support' score was 112. Table 4 includes each economic evaluation technique item asked.