How well do we search for missing people in Queensland, Australia?

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Abstract

Most countries, states or counties have an organised Search and Rescue (SAR) response to reported missing people, whether it is by statutory authorities such as the police or by volunteer groups. The success or otherwise of the ensuing searches is often dependent on the training of the coordination team and the adherence to known and proven search strategies. It would be realistic to assert that the chances of a successful search are reduced if the coordinator cannot put those searchers in the right location. This paper examines the functionality of the SAR system in Queensland, looking at the coordination structure, the strategies utilised in determining search areas and whether they are still fit for purpose. The response to SAR is a police responsibility with the assistance of volunteer groups such as the State Emergency Service, and to this end a significant effort is undertaken to train both police coordinators and volunteer searchers.

KEY WORDS: *Search, Rescue, Theoretical, Statistical, Subjective, Deductive*

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Introduction

The aim of this study is to provide an analysis of a single jurisdictions use of search techniques in searching for missing persons in a land environment, and the success thereof. The focus of this paper is on the state of Queensland, Australia, and is the first known study that encompasses an entire policing jurisdiction. At 1.8 million km² Queensland represents 23% of Australia's landmass (Roberts, 2007) and has 34% of the nationally reported missing people (National SAR Council, 2022). Missing people in Queensland have an excellent chance of being found and recovered due to the continual refinement of the search and rescue (SAR) system and associated technology, including mobile telephone location systems, night vision and thermal imaging devices (Queensland Police Service, 2021). The collection of data on SAR commenced in 1976 and identifies that police in Queensland have coordinated an

average of one land search daily (Queensland Police Service, 2021). This has resulted in approximately 17,300 missing people being located and recovered and a further 481 who have never been found (Queensland Police Service, 2021).

Search methods are similar across all Australian police jurisdictions; however, Queensland's SAR system is unique compared to other states/territories. It has four levels of SAR Coordination based on the level of training undertaken by each officer as contained in Table 1. At the apex is the State SAR Coordinator, who has the responsibility of managing the state for all SAR incidents including reviews of operations and presenting evidence at coronial inquests where people were not found or found deceased. This position also provides the other three levels of SAR training. Additionally, the position represents the state in the national SAR forum.

Table 1 *SAR Coordinator level and roles*

SAR Coordinator Level	Title	Role	Qualification
1	State Search and Rescue Coordinator & Training Officer (SSARCTO)	Managing SAR System and providing training	Advanced Diploma of Police Search and Rescue Management Certificate IV – Training and Assessment
2	Senior Search and Rescue Officer (Sen SARO)	Marine, Aviation and Land SAR (SAR Management)	Advanced Diploma of Police Search and Rescue Management
3	Search and Rescue Officer (SARO)	Marine, Aviation and Land SAR (Coordination)	Diploma of Police Search and Rescue Coordination
4	Field Search Coordinator (FSC)	Land SAR only	Internal Police SAR Course

The first three tiers require officers to complete formal nationally recognised qualifications in SAR, while the FSC role is an internal course. This role was developed to provide a SAR capacity in those areas away from the coastline and in the more remote parts of the state. A flow chart of the system is shown in Figure 1.
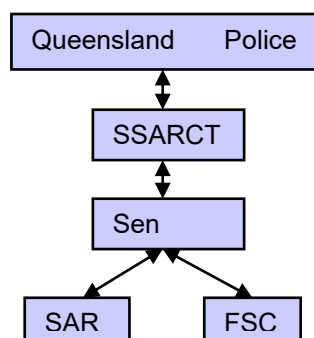

Figure 1 *Flow chart of Queensland SAR Structure*

The National SAR Manual (Whitehead, 2021) is the standard reference document for use by all search and rescue authorities and organisations that provide search and rescue services to Australia. It is an open-source document and represents the collective SAR knowledge of Australia and is continually being updated through incident debriefs and coronial findings, an example being the Inquest into the death of Darrell Simon and the necessity to electronically record all search efforts (Lock, 2018). The manual provides the methods, options, working papers and data for all Australian SAR operatives. It is sponsored by the National SAR Council and maintained within the Australian Maritime Safety Authority (AMSA). While the International Aeronautical and Maritime Search and Rescue Manual (IMO. & ICAO., 2016) provides a broad overarching international manual for SAR, the National SAR Manual is only one of three that covers an entire country, and in Australia's case, a continent.

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Aim:

This paper is an overview of the search and rescue (SAR) methods and strategies used by the Queensland Police in the search for missing people within that state. The paper will discuss the various search strategies as outlined within the National SAR Manual, with a view to determining the efficacy of their use, the results of these searches and the necessity for any changes to operational procedures. This is the first known state-wide study into a single jurisdiction SAR system

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Overview:

There has been a significant body of work devoted to search and rescue (Koester, 2008; NASAR, 2018; Stoffel, 2006; Syrotuck, 2000) but no single jurisdiction study of how SAR is undertaken. The dictionary definition of lost is not knowing ones whereabouts or able to find a way out, whereas missing is absent from a place and in an unknown location (Gwynn & Laugesen, 2020). The National SAR Manual refers to targets of the SAR system as missing (Whitehead, 2021). This study will use the term 'missing' to refer to both missing and lost people as the same search strategies are used for both types. Organised searching for these persons is based on two contingent steps, a reflex search, and if unsuccessful, a formal search (Whitehead, 2021). A reflex search provides a rapid response with minimal planning. As an aid it is based on a bicycle wheel where the hub represents the last known point of the missing person, or if this is not known, an initial planning point based on the intelligence gathered as shown in Figure 2.
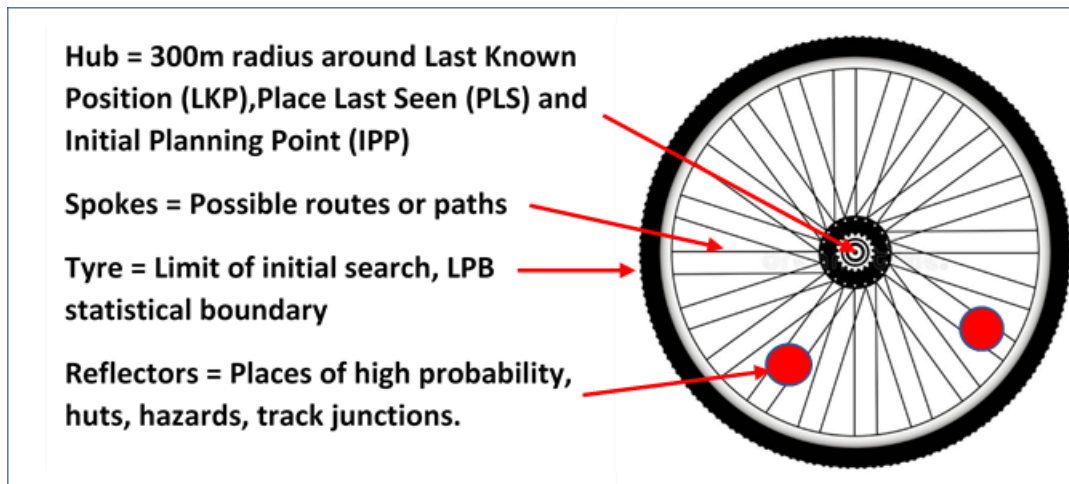
Figure 2. *Reflex search. Note: Sourced from Koester (2008)*

The spokes represent the options of travel available to the missing person, in some locations there may only be one direction of travel possible so the wheel would have only one spoke, while at other locations there may be dozens of possible routes with an associated number of spokes. The hub is the inner boundary of the search and may be as close as 300-600 metres from the last known location depending on the terrain and vegetation. The boundary radius determined by the coordinator through experience and available data. The tyre represents the Missing Person Behaviour (LPB) statistical boundary, which is the furthest distance a person in any particular category could statistically travel. Any points or places of interest are represented by the wheel reflectors.

The 19% of missing people not found by the reflex search require a more extensive process of search area determination (Queensland Police Service, 2021). This extensive process is called the Formal Search(Whitehead, 2021). The Formal Search comprises four separate, but mutually inclusive search strategies; theoretical, statistical, subjective and deductive. The strategies are layered to provide the best possible area in which to put the search resources.

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Search Strategies

The Theoretical search strategy was initially derived by Scotsman William Naismith, in 1892 (Thompson, 2010). Naismith escorted the wealthy gentry on walks through the Scottish Highlands and developed his rule as a means of working out how long it would be expected to take for each particular walk (Thompson, 2010). Although it has been used since 1892 for walking and hiking activities it appeared in official print for the first time in 1996, however it was not referred to as the Theoretical search strategy (UK Statutory Instruments, 1996). This rule is used in reverse for SAR, seeking to identify a maximum distance that could be travelled in a particular time period, and was first named as Naismith's Rule in Australia in the 2008 National Land Search Operations Manual (Whitehead, 2008). While there are incidents where this strategy will be of little use, such as shoreline incidents and locating flood victims and physically impaired dementia patients, it is one of the four formal strategies. The major drawback with this strategy is its inflexibility. The strategy cannot easily be varied to consider the

missing person, experience and weather, often providing a very large diameter circle inside which the missing person will be found. Additionally, this rule also does not consider a person's fitness, weather, daylight or any other considerations. However, it does provide the largest possible initial search area based solely on a person's ability to walk in a straight line within a calculated time period.

The Statistical search strategy was initially based on the International Search and Rescue Incident Database (ISRID) (Koester, 2008). The ISRID is a statistical analysis of over 50,000 missing persons mainly from the USA, New Zealand, UK and Canada and where they were found. A similar Australian missing person study was undertaken between 2000 and 2006 (Twardy, 2006) with the results tabled at the National SAR Council. As this was the first study of this nature it was not comparable to anything but has since been validated by ISRID. The current Australian Missing Person Behaviour (LPB) Database has been collecting Australian data since 2010 (Whitehead, 2021) and forms the basis for Australian LPB as contained within appendix E-5 of the National SAR Manual. This model is continually being updated with data from the Australian Missing Person Behaviour Database and is based on the ISRID data (Koester, 2008), although not as detailed. Over the last two years sufficient data has been obtained to include two new categories of missing person, prospectors and children with ADD, ADHD, Asperger's and autism (Whitehead, 2021). A minimum of fifty incidents in a category has been the trigger point for analysis. Overall, this may be considered a small number of incidents, but it is the start point for the development of new categories. As more incidents are entered the LPB category is continually modified and as such more effective at finding missing people.

The third search strategy, 'Subjective', is based on a search coordinator's ability to interpret a map, their personal knowledge of the locality and experience to identify natural or man-made barriers (Whitehead, 2021). Identification of these barriers can provide areas that would either limit a missing person's options of travel or that would funnel or force them to move in a particular direction, such as being confined to a steep sided valley system. This strategy also includes decision points, locations where the missing person has an option of two or more directions of travel.

The final strategy is 'Deductive', which is looking at the facts of the situation, such as intentions and distance of the bush walk if that was the case, and from this, undertake an appreciation to determine potential routes and actions of the missing person (Whitehead, 2021). This is often more akin to making logical assumptions of the missing person's behaviour given the situation and can be very valuable when the person's intentions are not known, such as where they were going. The difference between subjective and deductive is that subjective is reliant on the topography of the search area to identify potential routes. Deductive is using the facts of the situation to determine what the missing person may have been attempting, ie a walk between A and B, to find a suitable location for photographs or if afflicted with dementia possibly a home lived at in the past. Table 2 highlights the benefits and detriments of the four strategies.

Table 2 *Benefits and Detriments of formal strategies.*

Strategy	Benefits	Detriments
Theoretical	Relatively simple mathematical calculation. Provides largest search area possible under circumstances.	Does not take into account target ability, weather, daylight/darkness, topography or vegetation.
Statistical	Based on what most targets in similar situations do. Relatively easy to calculate search radii using tables.	Relies on ongoing accurate data input.
Subjective	With experience can be done through map interpretation quickly.	Relies on a coordinators map reading and interpretation abilities.
Deductive	Looks at the situation facts to determine options for target. Can be enhanced through judicious questioning of family, friends etc.	Does require some skill in identifying facts and making rational interpretations.

No single strategy should be used in isolation as all four strategies act in a layered formation. Using all four strategies together it is possible to determine the area of highest probability, which becomes the basis for being able to sub-divide the search into smaller, searchable areas and tasking to search teams (Whitehead, 2021).

Methodology

This study is part of a much larger project based around the disposal of homicide victims and how to better search for them. In order to do so, an understanding of current SAR methods was necessary to determine if the same search approaches could be modified to locate disposed homicide victims. A fourteen-question survey was developed using a combination of Likert type data (Boone & Boone, 2012), binary and a single free text open-ended question (Loc Phuoc & Ngamnij, 2013). This survey was electronically distributed to all police officers (n = 310) who undertake a SAR coordination role in Queensland. At the conclusion, grouping was undertaken to reduce responses to yes/no to simplify tabulation. The survey sought to answer questions such as SAR role, experience, use of the five SAR strategies, success rate of the strategies and use of the National SAR Manual. Examination included univariate and chi squared analysis using IBM SPSS ™ Version 27.

There are 310 SAR trained police throughout the state of Queensland, and the response rate was 77%, of which 73 (30.4%) respondents noted that they had not coordinated a search and rescue incident and could not respond to the remaining questions. These responses have been removed from the analysis

leaving 167 responses. The survey response rate was very high for both FSC's and Senior SARO's, 95% and 97% respectively. It is unknown why the SARO response rate is lower, although the overall response rate is acceptable according to Hendra (2019).

The free text data was cleansed though data grouping of like subjects and removing syntax differences. There was also coding and data grouping of the five questions relating to strategy usage to enable improved analysis. This involved grouping the terms '*All of the time, Most of the time and Some of the time'* into a single 'yes' grouping for the strategy usage analysis.

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Results

Of the 167 SAR Coordinators who had coordinated at least one incident, 36 (21.6%) have a SARO diploma, and 31 (18.6%) have an advanced diploma. (Table 3)

Table 3 *SAR Coordinator Composition and education levels.*

	Current SAR level			
	FSC	**SARO**	**Sen SARO**	**Total**
Number of SAR People	165	113	32	310
Number of responses (+1 SAR incidents)	100	36	31	167
Number of responses (Nil SAR incidents)	56	17	0	73
% of Responses	95%	47%	97%	77%

Sen SARO's are more likely (X^2=103.16; *p* < .01) to have undertaken 'more than 50 SAR incidents'. Diametrically, FSC's have the highest number of those with 1-10 incidents, again aligning with their relative juniority within SAR. Several anomalies are evident, two Sen SARO's with less than 30 incidents and 8 FSC's with over 50 incidents to their credit (Figure 3).

Figure 3 *SAR incidents coordinated.*
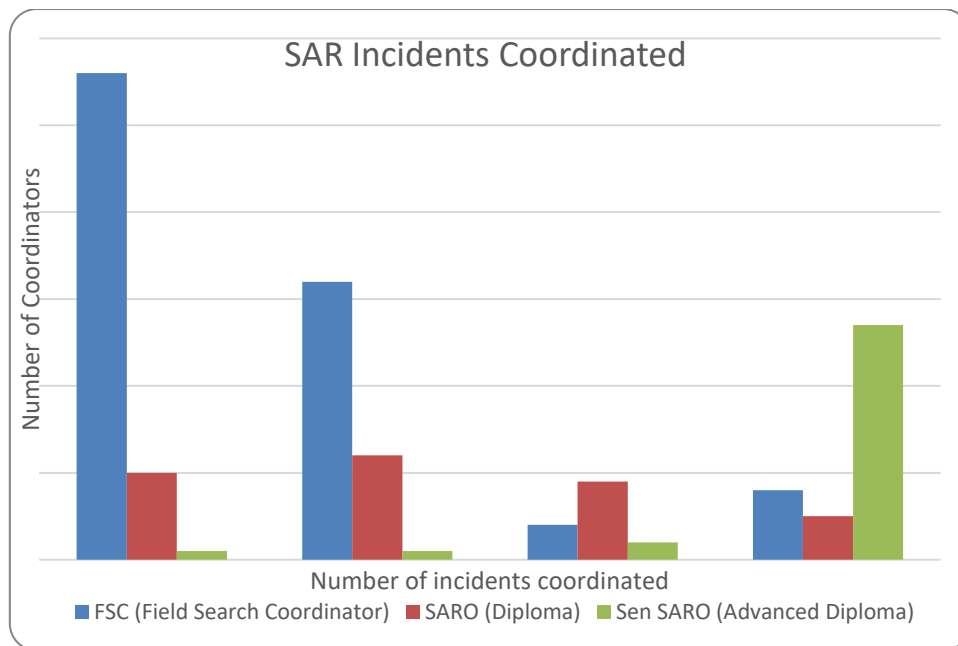
There were no SAR members who had only coordinated marine and aviation SAR incidents. Predominately (61%) Sen SARO's have undertaken all three disciplines. Among all levels of training two thirds (67%) of respondents had only coordinated land SAR incidents, including air crashes (Table 4). FSC's are more likely to undertake land searches (X² = 1.0408; p < .05).

Table 4 *SAR incidents coordinated.*

		Current SAR level			
		FSC	**SARO**	**Sen SARO**	**Total**
What type of SAR incidents have you coordinated?	Land	94	13	5	112 (67%)
	Land and aviation	6	1	1	8 (5%)
	Land and marine	0	19	6	25 (15%)
	Land, marine and aviation	0	3	19	22 (13%)
Total		100	36	31	167

All search strategies are used in the majority (91-98%) of instances, with very few instances where they have not been used (2-9%). The Reflex search is the first option, utilising the initial search teams and providing a rapid response to the situation, and historically, this has been successful 81% of the time (QPS 2021) (X² = 2.4316; *p* < .05). Table 5 shows that FSC's are less likely to use all four strategies (X² = 8.326; *p* < .05). An average of 94.5% usage rate for all strategies combined is significant to the success of SAR in Queensland.

Table 5 *Comparison of Search Strategies used by SAR skill level*

		SAR level			
		FSC	**SARO**	**Sen SARO**	**Total**
Have you used the Reflex/Initial Search Strategy?	Yes	91	35	31	157 (94%)
	No	9	1	0	10 (6%)
Total		100	36	31	167
Have you used the Theoretical Search Strategy?	Yes	96	33	30	159 (95%)
	No	4	3	1	8 (5%)
Total		100	36	31	167
Have you used the Statistical Search Strategy?	Yes	94	36	31	163 (98%)
	No	6	0	0	6 (2%)
Total		100	36	31	167
Have you used the Subjective / Decision Point Search Strategy?	Yes	92	35	31	158 (95%)
	No	8	1	0	9 (5%)
Total		100	36	31	167
Have you used the Deductive Search Strategy?	Yes	87	35	30	152 (91%)
	No	13	1	1	15 (9%)
Total		100	36	31	167

With respect to the use of the National SAR Manual the respondents indicated that it had been useful in the majority of instances, with only a small percentage (13%) of coordinators either having never used it or found it not useful ($X^2 = 0.5127$; $p < .05$), (Table 6). There is no obvious explanation why more FSC's are not using the manual compared to the other SAR levels, except that they may be using the old National Land Search Operations Manual, although this was merged with the National SAR Manual in 2017.

Table 6 *Use of National SAR Manual*

		Current SAR level			
		FSC	**SARO**	**Sen SARO**	**Total**
Has the National Search and Rescue Manual been useful in assisting with the development of search areas?	Never used it	16	3	0	19 (11%)
	No	2	1	0	3 (2%)
	Yes	82	32	31	145 (87%)
Total		100	36	31	167

Most missing people are found within the areas of the respective search strategies (X^2 = 41.79; *p* < .05). There are several identified anomalies within the responses, particularly with the theoretical and statistical responses, which will be discussed later. Coordinators with the most experience, SARO's and Sen SARO's, developed search areas that were more appropriate as shown by the small number of missing people found outside the individual strategies. (Table 7)

Table 8 shows the additional methods that have been suggested by a small percentage (16%) of the respondents. The majority, 84% (n=140) identified that they could offer no further suggestions for search tactics.

Table 7 *Validation of the five search strategies.*

		Current SAR Level			
		FSC	SARO	Sen SARO	Total
Was the target found within the Reflex Search Strategy area?	Yes	67	25	25	117 (70%)
	No	33	11	6	50 (30%)
Total		100	36	31	167
Was the target found within the Theoretical Search Strategy area?	Yes	73	33	29	135 (81%)
	No	27	3	2	32 (19%)
Total		100	36	31	167
Was the target found within the Statistical Search Strategy area?	Yes	94	36	31	161 (96%)
	No	6	0	0	6 (4%)
Total		100	36	31	167
Was the target found within the Subjective / Decision Point Search area?	Yes	81	36	31	148 (89%)
	No	19	0	0	19 (11%)
Total		100	36	31	167
Was the target found within the Deductive Search area?	Yes	71	33	31	135 (81%)
	No	29	3	0	32 (19%)
Total		100	36	31	167

Table 8 *Additional SAR methods identified.*

		Current SAR Level			
		FSC	SARO	Sen SARO	Total
Have you identified additional methods of determining a land search area?	No	81	36	23	140
	Combined SAR practices	6	0	3	9
	Improved local knowledge	8	0	1	9
	Increased use of SAR Technology	4	0	3	7
	Social Media	1	0	1	2
Total		100	36	31	167

Discussion

SAR coordinators are actively using the search strategies as contained within the National SAR Manual to good effect, with a 96.9% success rate in finding missing people in land situations within Queensland (Queensland Police Service, 2021). This success rate is comparable with New Zealand at 98.1% (Ferner et al., 2022) and more so with Queensland being 6.9 times larger, has a greater population and approximately the same number of active SAR coordinators (Ferner et al., 2022). There are no other comparable country SAR rates known. This demonstrates that the current search strategies, when used, are providing a sound basis for locating missing people. Respondents identified few other search strategies beyond those described in the National SAR Manual (Whitehead, 2021). The larger number of FSC's reflects the vastness of Queensland and the necessity to have trained police in as many locations as possible.

Coordination

The number of incidents coordinated provides a broad overall picture of the experience among SAR coordinators. While the coordination is undertaken by police, the actual searching is done with a combination of police (General duties, dog handlers, helicopter crew, divers and off-road motorcycle riders) and volunteers from the State Emergency Service, and on very rare occasions by the general public, depending on the location. As training of SAR members is consistent and in accordance with the National SAR Manual, this ensures a common outcome and where lessons are learnt they can easily be distributed across the network. The benefit of this system is the seamless ability for a SAR incident to be managed anywhere throughout the state. A study by Ferguson (2021) identified that respondents to their SAR training survey came from 17 different departments across three regions of Canada. The respondents for this paper all came from the same jurisdiction.

Strategic usage

The reflex search strategy, (Whitehead, 2021), was designed as a quick way to initiate a search with limited resources and information. Its use by the majority (89%) indicates that it is a well-tested strategy that provides an immediate response to a SAR situation. While more prolific with the younger SAR members than older ones its usage is validated through the finding of 81% of missing people without the need to resort to a more formal search (Queensland Police Service, 2021). A version of this strategy has been around for many years, although it never had a particular name until 2015 and was solely used by land searchers as there is no equivalent marine version (Whitehead, 2021).

Theoretical strategy (Whitehead, 2021), was used by almost all land SAR coordinators (95%) and was the backbone of SAR for many years. At first glance this strategy could easily be dispensed with but there are a few occasions when this strategy is likely to provide a smaller search area than that of the Statistical strategy, mostly when the time elapsed by the missing person is relatively short (Whitehead,

2021). If there has been no intervention with the missing person by others then the theoretical calculations should represent the greatest distance, and therefore area, that the missing person could travel in the time they have been missing. FSC's are the largest grouping where this strategy has not worked, and while there is no obvious reason for it several possibilities arise; the calculations were incorrect in that insufficient weight was given to speed of travel or time elapsed or that the initial LKP was incorrectly determined.

The statistical strategy is the most used of the four formal strategies (98%) and as it relies less on calculations, appreciations or deductions is possibly the easiest to initiate. The area resulting from the application of the statistical strategy is commonly smaller than that of the theoretical, providing a search area that is reasonably able to be searched quickly. The high rate of usage reflects its importance within SAR, notwithstanding that it is one of four interdependent strategies. References to the statistical strategy are easy to locate within the National SAR Manual and a significant period of training is devoted to it, again, reflected in the usage rate. Only 4% of missing people were located outside the statistical search area, and given that it is based on what most missing people have done in the past this is a remarkable achievement. Entry of this data into the database ensures that the statistics relied on to develop the strategy are as up to date as possible.

The subjective strategy was used by 159 (95%) responding coordinators. Initial and refresher training has identified that map reading skills are becoming less prevalent among SAR coordinators, and possibly younger people in general (Whitehead, 2020b). Evident through training courses and real-time incidents is that newer SAR Coordinators rely heavily on electronic aids such as Google Earth and GPS devices (Queensland Police Service, 2021). While it is necessary to have an appropriate level of technical or computer skill, SAR is heavily reliant on the ability of a coordinator to identify land topography and features when developing a search area (Whitehead, 2021). The depreciation of this skill is reflected in the 11% of missing people who were found outside of this strategy. As a result of this, map reading and the skills to do so have become a larger part of training and is included in the biannual skills competency workbooks completed by all QPS SAR Coordinators (Whitehead, 2020a).

Utilising the known facts to make judgement-based assessments on the possible movements of the missing person is the basis for the Deductive Strategy (Whitehead, 2021). In doing so it is possible to narrow down the travel and intention options to a small number of possible courses of action by the missing person (Whitehead, 2021). This allows the often-limited resources available to a coordinator to be used to better effect on a smaller number of search areas. Undertaking a deductive analysis is a skill that needs to be learned, in the way a detective needs to look at the facts, and this survey identified that 19% of incidents resulted in the missing person being in a location other than what was deduced. More work in this space will need to be planned for.

It is encouraging to note that the majority of search coordinators are using all five strategies, and this may be a significant contributing factor to the 96.9% success rate in finding missing people in Queensland (Queensland Police Service, 2021).

Success

In theory, more people should be found outside of the statistical search area, than the theoretical search area, however this survey indicated that more people were found outside the theoretical search area (19%) when compared to the statistical (4%). It is impossible for more missing people to be outside a generally larger circle than a smaller circle within the larger circle. This would perhaps indicate the poor wording of the question, which should have asked how many people were found outside each strategy search area rather than a yes or no answer.

The statistical strategy, while being well used, does have some inherent problems. Being a statistics-based strategy, it is very much dependent on the information from SAR incidents being inputted by SAR coordinators, and there can never be a guarantee that all incidents are captured. There have been a small number of incidents where the missing person was found outside this area. While the 80% statistical distance ring is the most often used search distance (Whitehead, 2021), the LPB categories also include greater distances out to 95%. As not all land SAR incidents are entered onto the Australian Missing Person Behaviour Database it is not possible to determine the entirety of distances that missing people are found at (Whitehead, 2019). Further investigation into these figures will determine if greater statistical distances are being used.

A small number of targets were found outside the subjective and deductive search areas, 11% and 19% respectively. These figures underlie the need for a SAR coordinator to practice map reading and intelligence gathering skills in order to make valid assessments of the terrain and intentions (Whitehead, 2020b). In several of these instances where the missing person was found outside of the search area there is doubt about the initial starting point, which itself is often based on limited intelligence gathering, and this was frequently confirmed with follow-up interviews with the missing people after the incident (Whitehead, 2021).

From the data available, it is possible to develop search area determination, which is a combination of all strategies, noting that time has an impact. The chances of a missing person being outside a search area decrease as each strategy is applied, and when all four formal ones are used concurrently the highest probability search area should be apparent (Whitehead, 2021). In a perfect world no missing person should be outside a theoretical search area if it has been applied properly, and a small number outside a statistical search area as the LPB is reliant on what most missing people have done in the past. The fact that some missing people are never found suggests that they have done something out of the ordinary. The aim of these strategies is to develop a search area that has the highest probability of finding the missing person and can withstand coronial and community scrutiny in the event the missing person is not found. This survey indicates that most SAR Coordinators use all available strategies at their disposal.

SAR Manual

The information contained in the National SAR Manual was found to be useful by 87% with the remainder indicating that it either wasn't or they had not used it. The National SAR Manual is the single point of reference for all SAR within Australia, and is a guide with many alternative methods to assist in gaining a successful conclusion to an incident (Whitehead, 2021).

Other strategies

Respondents were asked to provide information on other strategies that they had found useful during SAR incidents via an open-ended free text question. A negative response was provided by 140 (84%) while the rest were grouped into four areas. The use of combined search practices based on circumstances and search asset availability was identified by 9 (5%) respondents, and this appears to relate to the use of all available strategies taking into account the individual SAR circumstances, and, as identified, is a standard SAR tactic. A further 9 (5%) suggested using improved local knowledge, and from experience this would include landowners, National Park Rangers, State Emergency Service members and civilians who have previously searched in that location. The increased use of SAR technology had a response rate of 7 (4%). Two responses quoted 'Technology and IT mapping/triangulation programs' and 'GPS tracks and telephone pings'.'Technology such as drones, electronic mapping, telephone triangulation and increased use of GPS devices has been addressed over the period since the survey was taken as a result of Coronial recommendations (Queensland Treasury, 2021). The final suggestion was the use of social media, made by 2 respondents. This area of SAR is continually improving as methods of accessing the social media accounts of missing people are developed, often requiring specialist electronics knowledge.

Survey limitations

Several limitations were identified with this survey, which has the potential to affect the results. The response rate was only 70% of eligible coordinators who had coordinated at least one search from a potential pool of 238 (72 had not coordinated a SAR at the time of this survey). Although, as identified in Hendra and Hill (2019) it is not believed that this will cause any significant bias to the results. The second limitation was the wording for several questions, allowing only for a yes/no response, leaving little ability to investigate anomalies further. This situation will be addressed in a future survey.

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Conclusion

The usage of all five land search strategies has been relatively high across all SAR coordinators and the results, locating missing people, have been commensurate with this. The search strategies were not designed to be used alone, working far better when done concurrently to produce a valid search area that can withstand scrutiny and provides a high probability of success.

This survey has been beneficial in several ways. It has provided valuable data into the usage of the current search strategies, and perhaps the need for continual ongoing training of coordinators on the value of using these strategies. Also, it has identified that the current methods of searching are producing the results expected from coordinators by the community, although, as in most endeavours involving people, the human factor can make it difficult.

The National Search and Rescue Manual provides all SAR coordinators with the strategies to resolve a SAR incident and to achieve the best possible outcome and is based on the collective experiences of coordinators. This survey, while restricted to Queensland, shows that the current methods of land search are valid and are being actively used. The strategies are guiding principles and when augmented with the experience of a SAR coordinator provide the missing person with the greatest chance of being located and rescued.

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