

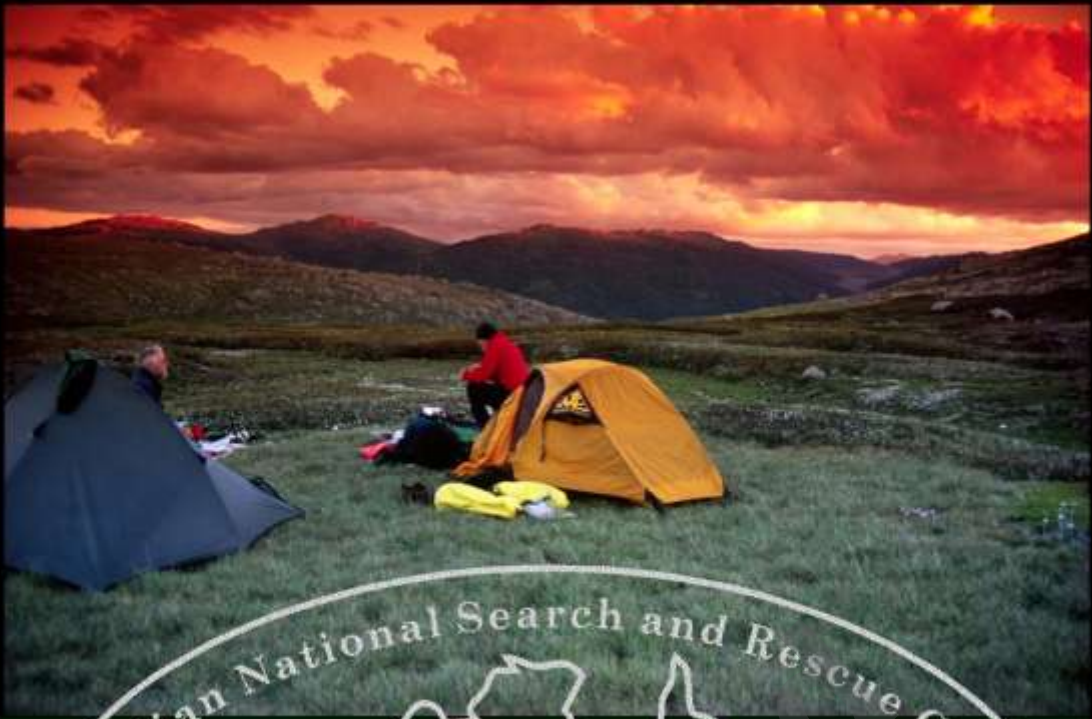
Australian Disaster Resilience Handbook Collection

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Australian Institute for
Disaster Resilience



Australian National Search and Rescue Council

National Land Search Operations Manual

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TABLE OF CONTENTS

CHAPTER ONE - SEARCH AND RESCUE SYSTEM 16

PART A - ORGANISATION AND COORDINATION – THE NATIONAL SAR PLAN 16

1.01. AIM:.....	16
1.02. GLOBAL SAR ORGANISATION AND ARRANGEMENTS	16
1.06. NATIONAL AND REGIONAL SAR SYSTEM ORGANISATION.....	16
1.10. AUSTRALIAN MARITIME SAFETY AUTHORITY (AMSA)	16
1.17. AUSTRALIAN DEFENCE FORCE – MILITARY SAR.....	18
1.20. NAVY.....	18
1.21. ARMY	18
1.22. AIR FORCE.....	18
1.23. COMMANDER NORTHERN COMMAND (COMNORCOM).....	18
1.24. AIR SERVICES AUSTRALIA	18
1.28. OTHER COMMONWEALTH AGENCIES/AUTHORITIES	19
1.29. BUREAU OF METEOROLOGY	19
1.30. EMERGENCY MANAGEMENT AUSTRALIA (EMA).....	19
1.32. BORDER PROTECTION COMMAND.....	19
1.34. AUSTRALIAN COMMUNICATIONS AND MEDIA AUTHORITY	19
1.35. AUSTRALIAN TRANSPORT SAFETY BUREAU (ATSB).....	19
1.36. CIVIL AVIATION SAFETY AUTHORITY (CASA)	19
1.38. VOLUNTEER ORGANISATIONS.....	19
1.39. COMMERCIAL AND PRIVATE ORGANISATIONS	19
1.44. SAR COORDINATION – OVERVIEW.....	20
1.47. DETERMINATION OF SAR AUTHORITY RESPONSIBLE FOR OVERALL COORDINATION.....	20
1.49. INITIAL RESPONSE.....	20
1.50. SAR AUTHORITY BEST PLACED TO COORDINATE.....	20
1.51. NOTE	20
1.55. EFFECTIVE CONSULTATION AND COORDINATION	21
1.57. COORDINATION OF POLICE LAND SEARCH	21
1.58. COOPERATION WITH FOREIGN COORDINATION CENTRES	21
1.63. PROVISION FOR ENTRY OF FOREIGN AIRCRAFT DURING SAR OPERATIONS	21
1.64. REQUESTS FOR ASSISTANCE FROM FOREIGN RCC’S.....	22
1.65. DISTRESS BEACONS	22
1.68. TRANSFER OF COORDINATION – REASONS FOR TRANSFER OF COORDINATION.....	22
1.74. TRANSFERRING OVERALL COORDINATION.....	23
1.80. ACCEPTING COORDINATION FOR A COMPONENT OF THE SAR EVENT FROM ANOTHER SAR AUTHORITY	23
1.81. GUIDANCE IN SUPPORT OF TRANSFERRING COORDINATION OF A COMPONENT OF A SAR OPERATION	23
1.83. TRANSFER OF COORDINATION AFTER SUSPENSION OF SAR ACTION	24
1.90. AMSA ASSISTANCE TO OTHER SAR AUTHORITIES	25

1.91.	PROVISION OF SUBJECT MATTER EXPERTISE AND ADVICE.....	25
1.92.	BRIEFING FOR AIR ASSETS.....	25
1.93.	SOURCING OF AIRCRAFT	25
1.94.	TASKING OF AIRCRAFT.....	25
1.97.	COORDINATION OF AN AIR SEARCH	25
1.99.	CIVIL REQUESTS FOR MILITARY ASSISTANCE - LOCALISED EMERGENCY ASSISTANCE TO SAVE LIFE	26
1.101.	ALL OTHER REQUESTS FOR DEFENCE ASSISTANCE	26
1.104.	MILITARY REQUESTS FOR CIVIL ASSISTANCE.....	26
PART B - MANAGEMENT AND SUPPORT - SAR MANAGEMENT		26
1.106.	OVERVIEW.....	26
1.109.	SAR AUTHORITY	26
1.111.	RCC STAFF	27
1.113.	SEARCH HEADQUARTERS (SH)	27
1.116.	INITIAL ACTIONS.....	28
1.117.	FIELD SEARCH HEADQUARTERS (FSH)	28
1.118.	ASSEMBLY AREA	28
1.119.	BRIEFING AREA.....	28
1.120.	STAGING AREA.....	29
1.122.	SUPPORT BASE.....	29
1.123.	OPERATIONS—STAFF AND DUTIES	29
1.124.	SEARCH HEADQUARTERS – LOCATION AND COMMAND	29
1.125.	COMMANDERS RESPONSIBILITIES.....	29
1.127.	SAR MISSION COORDINATOR.....	30
1.128.	SMC QUALIFICATIONS.....	30
1.130.	SMC RESPONSIBILITY.....	30
1.134.	ASSISTANT SAR MISSION COORDINATOR (A/SMC).....	32
1.135.	A/SMC QUALIFICATIONS.....	32
1.136.	A/SMC AUTHORITY.....	32
1.137.	A/SMC RESPONSIBILITIES AND DUTIES	32
1.138.	ALLOCATOR	32
1.139.	RECORDER.....	32
1.140.	BRIEFING OFFICER	32
1.141.	INTELLIGENCE OFFICER	32
1.142.	RESCUE PLANNER	32
1.143.	LIAISON OFFICER	32
1.144.	ON SCENE COORDINATOR.....	32
1.145.	ADF LIAISON OFFICER	33
1.147.	SEARCH TEAM LEADERS	33
1.148.	DELEGATION	34
1.149.	SUPPORT BASE	34
1.151.	SUPPORT BASE SUPERVISOR.....	34
1.154.	INFORMATION	35
1.155.	INFORMATION CLASSIFICATION.....	35
1.159.	SEARCH AND RESCUE RESOURCES:- OVERVIEW	36
1.165.	PERSONNEL	36
1.169.	DROPMASTERS, DISPATCHERS AND OBSERVERS.....	37
1.177.	RESCUE PREPARATION.....	37

1.178.	PUBLIC RELATIONS	37
1.180.	OPERATIONS INVOLVING TWO OR MORE SAR AUTHORITIES	38
1.182.	PUBLIC RELATIONS OFFICERS OR MEDIA OFFICERS (PRO/MO's).....	38
1.184.	PRESS RELEASES	38
1.191.	REQUESTING PUBLIC ASSISTANCE.....	39
1.192.	LIAISON WITH RELATIVES.....	39
1.193.	NOTIFICATION OF NEXT OF KIN	39
1.198.	CASUALTIES	40

CHAPTER TWO - COMMUNICATIONS.....41

2.01.	SEARCH COMMUNICATIONS AND RADIO EMPLOYMENT	41
2.02.	COMMUNICATIONS.....	41
2.03.	COMMUNICATIONS OFFICER	41
2.05.	COMMUNICATIONS REQUIREMENTS	41
2.06.	HEADQUARTERS REQUIREMENTS	41
2.07.	TELEPHONE/RADIO	41
2.08.	REAR NET.....	41
2.10.	FORWARD NET	42
2.14.	FREQUENCIES	42
2.15.	RADIOS IN GENERAL	42
2.18.	GROUND TO AIR COMMUNICATIONS	43
2.20.	PROCEDURES AND PRACTICES	43
2.21.	OTHER METHODS OF COMMUNICATIONS.....	43
2.23.	SUMMARY	43

CHAPTER THREE – AWARENESS AND INITIAL ACTION44

3.01.	AWARENESS AND NOTIFICATION.....	44
3.03.	GENERAL CONSIDERATIONS FOR THE SMC.....	44
3.05.	SAR STAGES	44
3.07.	LAND SAR STAGES EXPLAINED.....	45
3.08.	LAND SAR INCIDENT	45
3.09.	EMERGENCY PHASES	45
3.11.	UNCERTAINTY PHASE	45
3.14.	ALERT PHASE.....	46
3.16.	DISTRESS PHASE	46
3.18.	ORGANISATION	46
3.19.	RESPONSIBILITY	46
3.25.	EVALUATION OF REPORTS	47
3.28.	SAR INCIDENT INFORMATION	47
3.29.	INFORMATION GATHERING	47
3.33.	THE INFORMATION STAGES	47
3.34.	INFORMATION GATHERING ASPECTS.....	48
3.35.	TYPE OF INFORMATION	48
3.36.	AVAILABILITY AND ACCESS OF INFORMATION	49
3.37.	SOURCES OF INFORMATION.....	49

3.38.	EVALUATING INFORMATION	50
3.41.	SEARCH INFORMATION PHASES	50
3.42.	EXTENDED SEARCHES	51
3.43.	NOTIFICATION TO STATES OF FOREIGN PERSONS IN DISTRESS	51
3.44.	RECORDING OF EVENTS	51
3.52.	URGENCY OF RESPONSE.....	52
3.59.	GENERAL TIME FACTORS.....	52
3.61.	DAYLIGHT FACTOR	52
3.62.	NIGHT FACTOR.....	52
3.64.	WEATHER FACTORS	52
3.69.	WEATHER REPORTS BY SURVIVORS	53
3.71.	URBAN ENVIRONMENT	53
3.72.	URBAN SEARCH STRATEGIES.....	54
3.73.	URBAN SEARCH - MAJOR COMPLEX.....	54
3.74.	URBAN SEARCH AREA SEGMENTATION	54
3.75.	URBAN ENVIRONMENT - RECONNAISSANCE SEARCH	54
3.76.	URBAN ENVIRONMENT -GENERAL SEARCH	54
3.77.	URBAN ENVIRONMENT - BUILDING/CONTACT SEARCH	54
3.79.	URBAN ENVIRONMENT, CONCLUSION	54
3.80.	FORENSIC SEARCH	55
3.81.	CAVES AND MINES.....	55
3.82.	AVAILABLE SEARCH ASSET FACTORS	55
3.87.	SURVIVAL EQUIPMENT FACTORS.....	55
3.89.	RISKS V GAIN FACTORS	55
3.93.	RESOURCES	56
3.95.	HUMAN RESOURCES	56
3.97.	HUMAN TRACKERS	56
3.100.	PHYSICAL RESOURCES	57
3.101.	AIRCRAFT.....	57
3.102.	FIXED WING AIRCRAFT.....	57
3.103.	ROTARY WING AIRCRAFT.....	57
3.104.	HELICOPTERS, ADVANTAGES	57
3.105.	HELICOPTER, DISADVANTAGES	57
3.106.	AIRCRAFT SAFETY	57
3.108.	HELICOPTER LOADING	59
3.112.	HELICOPTER LANDING ZONES	59
3.116.	ALLOCATION OF AERIAL SEARCH AREAS.....	60
3.118.	ALL TERRAIN VEHICLES	61
3.122.	MOTOR CYCLES	61
3.123.	METHOD OF OPERATION	61
3.124.	LIMITATIONS	61
3.125.	SEARCHING ON MOTOR BIKES	62
3.129.	TRACKING CONDITIONS	62
3.132.	FACTORS AFFECTING A SUCCESSFUL DOG SEARCH.....	62
3.133.	FACTORS AFFECTING AN UNSUCCESSFUL DOG SEARCH.....	63
3.134.	HORSES	63
3.138.	HORSES: ADVANTAGES.....	63
3.139.	HORSES, DISADVANTAGES.....	63

3.140.	DAMS, BILLABONGS AND STILL WATER SEARCHING.....	64
3.142.	FLOWING WATER.....	64
3.144.	BOATS	64
3.145.	DIVERS	64
3.146.	DIVERS, ADVANTAGES.....	64
3.147.	DIVERS, DISADVANTAGES	64
3.148.	VOLUNTEERS.....	65

CHAPTER FOUR - SEARCH PLANNING AND ASSESSMENT 66

4.04.	CONDUCTING AN APPRECIATION	66
4.05.	DEFINITION	66
4.06.	SEQUENCE.....	66
4.07.	PHASES	66
4.08.	AIM.....	66
4.09.	LIMITATIONS	66
4.10.	WRITTEN STATEMENT.....	67
4.11.	FACTORS	67
4.12.	EXAMINATION	67
4.13.	EXAMPLE.....	67
4.15.	COURSES OPEN	67
4.17.	PLAN.....	68
4.19.	PLANNING PRINCIPLES	68
4.20.	KEEP IT SIMPLE	68
4.21.	RELATE TO THE AIM.....	68
4.22.	LOGICAL DEDUCTIONS	68
4.24.	SEARCH PLANNING	68
4.28.	SCENARIO-BASED ASSESSMENT.....	69
4.30	SPECIFY ITEM SOUGHT	69
4.31.	CONFIRM LAST LOCATION.....	69
4.32.	ESTABLISH CIRCUMSTANCES OF DISAPPEARANCE.....	69
4.33.	NOTE FACTORS INFLUENCING DISCOVERY.....	69
4.34.	ANALYSE POSSIBLE STRATEGIES.....	69
4.35.	RAISE SEARCH STRATEGIES.....	69
4.36.	IDENTIFY PRIORITY SEARCH.....	70
4.37.	ONGOING REASSESSMENT	70
4.41.	SEARCH URGENCY	70
4.43.	TERRAIN FACTORS	71
4.47.	RAINFOREST ENVIRONMENT	71
4.50.	RAINFOREST CONSIDERATIONS	72
4.51.	RAINFOREST BEHAVIOURAL CHARACTERISTICS.....	73
4.52.	RAINFOREST RESOURCES CONSIDERATIONS.....	73
4.53.	ALPINE ENVIRONMENT.....	74
4.57.	ALPINE CONSIDERATIONS.....	74
4.58.	ALPINE BEHAVIOURAL CHARACTERISTICS	74
4.60.	ALPINE RESOURCES CONSIDERATIONS	75
4.61.	ARID ENVIRONMENT.....	75

4.63.	ARID ENVIRONMENT CONSIDERATIONS	76
4.68.	ARID ENVIRONMENT BEHAVIOURAL CHARACTERISTICS	76
4.69.	ARID ENVIRONMENT RESOURCE CONSIDERATIONS	76
4.70.	MOUNTAIN ENVIRONMENT	77
4.71.	MOUNTAIN CONSIDERATIONS: ACCESS	77
4.72.	COMMUNICATIONS.....	77
4.73.	CONTAINMENT	77
4.74.	TFFS	78
4.75.	LPB	78
4.76.	VERTICAL RESCUE	78
4.77.	TRAINING	78
4.78.	MOUNTAIN ENVIRONMENT SEARCH STRATEGIES	78
4.84.	DANGEROUS ANIMALS	78
4.85.	SALTWATER CROCODILES.....	78
4.87.	SNAKES	79
4.90.	SPIDERS	79
4.91.	SCORPIONS, CENTIPEDES AND MILLIPEDES.....	79
4.92.	TELEPHONE TRIANGULATION	80
4.93.	ESTIMATING THE MISSING PERSON LOCATION	80
2.	80
4.94.	THEORETICAL.....	81
4.95.	NAISMITH’S RULE	82
4.97.	STATISTICAL METHOD: LOST PERSON BEHAVIOUR	82
4.98.	GENERAL CATEGORIES OF LOST PERSONS.....	83
4.101.	SPECIFIC FACTORS OF LPB THAT MAY AFFECT SEARCH PLANNING: STATE OF HEALTH.....	83
4.102.	PAST EXPERIENCES	83
4.103.	PHYSIOLOGICAL EFFECTS OF THE ENVIRONMENT.....	83
4.105.	BIOLOGICAL CYCLES	84
4.106.	BEHAVIOUR WHILE LOST:	84
4.116.	SUBJECTIVE METHOD	87
4.115.	DEDUCTIVE METHOD.....	89
4.128.	SEARCH AREA SEGMENTATION	95
4.132.	SPECIAL SEARCHES – ABDUCTIONS/HOMICIDES	96
4.133.	REPORTING OF MISSING CHILDREN	96
4.134.	GUIDELINES.....	96
4.135.	DISTANCE RELATIONSHIPS.....	97
4.136.	WHERE TO LOOK	98
4.137.	MASS CASUALTY SAR INCIDENTS: CAUSAL FACTORS	98
4.138.	USAR.....	99
4.139.	COORDINATION	99
4.140.	INITIAL ACTIONS	99
4.141.	WORKING UNDER OR WITHIN A MIR	100
4.142.	MIR LIAISON OFFICER	100
4.143.	FIELD SEARCH HEADQUARTERS	101
4.144.	SEARCH STRATEGIES	101
4.145.	SEARCH PROBLEMS	102
4.146.	SEARCH AREA DELINEATION.....	103
4.147.	TASKING SHEETS	106

4.148.	BRIEFINGS	106
4.149.	RECORD KEEPING	107
4.150.	ELECTRONIC RECORDING OF SEARCH	107
4.151.	SUMMARY	108

CHAPTER FIVE - SEARCH TECHNIQUES AND OPERATIONS (LAND)..... 109

5.05.	LAND ASSETS	109
5.11.	MARINE ASSETS	110
5.16.	AIR ASSETS	110
5.34.	SEARCH PLANNING	112
5.37.	LAND SAR STRATEGIES.....	112
5.43.	IMMEDIATE RESPONSE	113
5.46.	FAST SEARCH	113
5.47.	FAST SEARCH TECHNIQUES.....	113
5.48.	FAST SEARCH CONSIDERATIONS	114
5.49.	RECONNAISSANCE SEARCH.....	114
5.50.	RECONNAISSANCE SEARCH, CONTAINMENT	114
5.51.	COMPOSITION OF RECONNAISSANCE TEAMS.....	114
5.52.	TASK OF RECONNAISSANCE TEAMS	114
5.54.	RECONNAISSANCE TEAM BRIEFING.....	114
5.55.	GENERAL SEARCH.....	114
5.56.	COMPOSITION OF TEAMS FOR GENERAL SEARCH.....	114
5.57.	GENERAL SEARCH METHOD	114
5.60.	CONTACT SEARCH.....	115
5.61.	COMPOSITION OF CONTACT SEARCH TEAMS	115
5.62.	TASKS OF CONTACT SEARCH TEAMS	115
5.63.	CONTACT SEARCH, SPECIAL CONSIDERATIONS	115
5.67.	CALCULATED SEARCH AREA	115
5.69.	SEARCH AREA COVERAGE.....	116
5.73.	TARGET TYPE.....	116
5.74.	METEOROLOGICAL VISIBILITY	116
5.75.	TYPE OF TERRAIN/ CONDITIONS	117
5.77.	SEARCH SPEED	117
5.80.	CLOUD COVER AND SUN LIGHT	117
5.82.	FIRST AND LAST SEARCH LIGHT	117
5.89.	VISUAL HORIZON	118
5.91.	AREA SWEEP	119
5.93.	ACCURACY OF NAVIGATION BY SEARCH TEAMS	120
5.94.	NIGHT SEARCHING.....	120
5.96.	SEARCH PATTERNS.....	121
5.97.	SAFETY OF THE SEARCH UNITS	121
5.104.	SEARCH PATTERNS.....	122
5.109.	GLOBAL POSITIONING SYSTEMS (GPS)	122
5.110.	COMMON SEARCH PATTERNS	123
5.111.	INDIAN FILE.....	123
5.113.	POINT AND FLANK.....	124

5.114. BARRIER.....	125
5.116. PURPOSEFUL MEANDERING	125
5.117. SQUARE	126
5.118. PARALLEL SWEEP (SINGLE TEAM.....	127
5.120 CREEPING LINE AHEAD.....	129
5.121. CONTOUR	130
5.122. EXPANDING SQUARE.....	130
5.123. VEHICLE SEARCH PATTERNS	131
5.124. VISIBILITY	131
5.126. URBAN SEARCH PATTERNS.....	132
5.131. SEARCH PATTERN CONCLUSION.....	134
5.135. CLUE RECOGNITION AND INTERPRETATION.....	134
5.136. GENERAL PRINCIPLES	134
5.138. SUBJECT OR CLUE GENERATOR	135
5.139. CLUES TO BE SOUGHT	135
5.140. CATEGORIES OF CLUES	135
5.141. SEARCH AREA	135
5.137. SEARCHERS OR CLUE SEEKERS.....	135
5.138. PROBABILITY OF DETECTION.....	135
5.139. TIME SEQUENCE.....	135
5.140. CALCULATION OF SEARCH TIME.....	135
5.143. INVESTIGATION TIME.....	136
5.147. BRIEFINGS	136
5.149. PREPARATION.....	136
5.150. PRESENTATION.....	136
5.151. VENUE.....	136
5.152. LIGHTING	136
5.153. WEATHER PROTECTION	136
5.154. BRIEFING AIDS.....	136
5.155. CONDUCT	137
5.156. SEQUENCE.....	137
5.157. ORDERS.....	137
5.158. ORDERS MUST	137
5.159. LAYOUT OF ORDERS	138
5.160. SITUATION (WHAT HAS HAPPENED.....	138
5.161. MISSION (WHAT THE TASK IS.....	138
5.162. EXECUTION (HOW THE TASK IS TO BE ACCOMPLISHED).....	138
5.163. ADMINISTRATION AND LOGISTICS (WHAT SUPPORT WILL BE PROVIDED AND HOW).....	139
5.164. COMMAND AND COMMUNICATIONS (WHO WILL BE IN CONTROL AND HOW THE COMMUNICATIONS WILL FUNCTION).....	139
5.165. ISSUING ORDERS.....	140
5.166. SYNCHRONISATION OF WATCHES.....	140
5.167. QUESTIONS FROM THE TEAMS.....	140
5.168. QUESTIONS TO THE TEAMS.....	140
5.169. CODE WORD.....	140
5.170. ACTION ON LOCATING THE MISSING PERSON(S)	140
5.173. MATTSON CONSENSUS.....	141

CHAPTER SIX – RESCUE PLANNING AND OPERATIONS..... 143

6.01.	GENERAL.....	143
6.07.	PREPARATION.....	143
6.09.	MEDICAL ASSISTANCE	143
6.10.	FIRST AID	143
6.11.	LAND RESCUE FOR MISSING PERSONS, CRASHED AIRCRAFT OR VEHICLES	143
6.25.	ACCIDENTS AND INJURIES TO RESCUE PERSONNEL.....	145
6.26.	AVOIDANCE OF DANGER.....	145
6.31.	HEALTH HAZARDS - AIRCRAFT ACCIDENTS.....	145
6.37.	USE OF AIRCRAFT FOR RESCUE	146
6.39.	USE OF HELICOPTERS FOR RESCUE.....	146
6.47.	USE OF TOP COVER AIRCRAFT WITH RESCUE AND MEDEVAC HELICOPTERS	147
6.51.	SUPPLY DROPPING AND DELIVERY OF SURVIVAL EQUIPMENT	147
6.53.	CIVIL SAR EQUIPMENT	147
6.58.	SUPPLY DROP FROM AIRCRAFT OVER LAND.....	148
6.59.	TRAINING SAFETY	148

CHAPTER SEVEN – CONCLUSION OF SAR OPERATIONS..... 149

7.01.	GENERAL.....	149
7.04.	CONCLUSION OF A SUCCESSFUL SAR ACTION	149
7.05.	SUSPENSION OF A SEARCH WHEN THE TARGET IS NOT FOUND.....	149
7.15.	REOPENING A SUSPENDED SEARCH.....	150
7.16.	RECORDS AND REPORTS	151
7.19.	INCIDENT DEBRIEFS.....	151
7.28.	CONDUCTING THE DEBRIEF	152
7.32.	CASE STUDIES	152
7.35.	PERFORMANCE IMPROVEMENT	153

CHAPTER EIGHT – TRAINING & EXERCISES..... 154

8.01.	GENERAL.....	154
8.02.	PROFESSIONALISM	154
8.04.	WHO TO TRAIN	154
8.05.	REQUIREMENT FOR TRAINING	154
8.08.	PUBLIC SAFETY TRAINING PACKAGE	154
8.10.	NATIONAL SEARCH AND RESCUE SCHOOL	154
8.14.	STATE/TERRITORY SAR AUTHORITY TRAINING	155
8.18.	SEARCH AND RESCUE EXERCISES	155
8.23.	TRAINING OF SAR UNITS.....	156
8.25.	FIRST AID TRAINING	156
8.26.	DROPMASER AND DISPATCHERS.....	156
8.29.	AIR OBSERVER TRAINING	156
8.30.	TEAM SKILLS.....	156
8.31.	INDIVIDUAL SKILLS.....	156

8.32.	MAP READING & NAVIGATION	156
8.33.	RADIO OPERATING PROCEDURES	156
8.34.	FIRST AID	156
8.35.	FIELD CRAFT	157
8.36.	OBSERVATION	157
8.37.	OBSERVATION SKILLS-DAY	157
8.38.	OBSERVATION SKILLS – NIGHT	157
8.39.	SEARCH TECHNIQUES	158
8.40.	TEAM SKILLS.....	158
8.41.	SEARCHERS	158
8.42.	SEARCH TEAM LEADERS.....	158
8.43.	DESIRABLE QUALITIES.....	158
8.45.	SKILLS	159

CHAPTER NINE - MEDICAL FACTORS 160

9.1.	TIME FRAME FOR SURVIVAL (TFFS).....	160
9.2.	SURVIVOR STRESS FACTORS.....	160
9.8.	SURVIVAL ENVIRONMENT FACTORS.....	160
9.12.	HYPOTHERMIA	161
9.14.	WATER HYPOTHERMIA	161
9.22.	WIND HYPOTHERMIA.....	162
9.28.	WIND CHILL	162
9.30.	HYPOTHERMIA	163
9.31.	HYPOTHERMIA SURVIVABILITY	163
9.32.	WET-CHILL SURVIVABILITY	164
9.33.	WATER IMMERSION	164
9.34.	EFFECTS OF ALCOHOL.....	164
9.35.	HYPERTHERMIA, HEAT STRESS AND DEHYDRATION.....	164
9.38.	HEAT EXHAUSTION	165
9.39.	HEAT STROKE.....	165
9.42.	HYPERTHERMIA	166
9.43.	DEHYDRATION	167
9.44.	PERIOD OF MOBILITY (POM).....	167
9.45.	SEARCH AREA TIME SCALE	168
9.46.	EXAMPLE.....	168

APPENDIX A..... 169

AUSTRALIAN STATES AND LAND SEARCH AREAS.....	169
----------------------------------------------	-----

APPENDIX C..... 172

APPENDIX D..... 176

TRANSFER OF SAR COORDINATION	176
------------------------------------	-----

<u>APPENDIX E</u>	177
<u>APPENDIX F</u>	178
MISSING PERSON QUESTIONNAIRE	178
<u>APPENDIX G</u>	179
OBJECT QUESTIONNAIRE.....	179
<u>APPENDIX H</u>	180
LAND SAR CHECKLIST	180
<u>APPENDIX I</u>	184
LOST PERSON BEHAVIOUR.....	184
<u>APPENDIX J</u>	198
LAND SEARCH PLANNING TABLES	198
SEARCH AREA QUICK REFERENCE	198
AIR SEARCH PLANNING TABLE	199
<u>APPENDIX K</u>	200
ADDITIONS TO NAISMITH’S RULE	200
<u>APPENDIX L</u>	201
PROBABILITY OF DETECTION (LAND).....	201
CAVEAT.....	201
AREA OF SEARCH.....	201
COVERAGE FACTOR (C).....	201
PROBABILITY OF DETECTION (POD)	202
CUMULATIVE POD FOR LAND SEARCH.....	205
<u>APPENDIX M</u>	206
MATTSON CONSENSUS	206
<u>APPENDIX N</u>	207

LAND SEARCH ORGANISATION CHART.....	207
<u>APPENDIX O.....</u>	<u>208</u>
HEADQUARTERS LAYOUT	208
<u>APPENDIX P</u>	<u>209</u>
SEARCH COMMUNICATIONS NET	209
<u>APPENDIX Q.....</u>	<u>210</u>
CLUE RECOGNITION.....	210
GENERAL PRINCIPLES.....	210
TRACKING SKILLS	210
TRAIL SIGNS	210
SIGHT.....	211
<u>APPENDIX R.....</u>	<u>212</u>
<u>APPENDIX S.....</u>	<u>213</u>

Archived

NATIONAL LAND SEARCH OPERATIONS MANUAL

The purpose of this manual is to provide a comprehensive reference source for those Authorities that have the responsibility for conducting land search and rescue operations within Australia.

This manual has been developed by a National Working Party representative of Police, State/Territory Emergency Services, the Australian Defence Force and the Australian Maritime Safety Authority and written by Senior Sergeant Jim Whitehead, Queensland Police Service. The working party was initiated and sponsored by the Australian Maritime Safety Authority.

Proposed changes to this document should be forwarded to the National Search and Rescue Manual Amendment Committee, Australian Maritime Safety Authority, at the address shown below.

CONTENTS

Glossary

Chapter 1	Search and Rescue System
Chapter 2	Communications
Chapter 3	Awareness and Initial Action (Initial considerations & Resources)
Chapter 4	Planning and Evaluation (Search strategy, considerations, environment)
Chapter 5	Techniques and Operations (Methods, Techniques, Patterns, Briefings)
Chapter 6	Rescue
Chapter 7	Conclusion
Chapter 8	Training
Chapter 9	Medical Factors (TFFS, Survival Calculations)
Appendix A	Map of Australia identifying States/Territories
Appendix B	SAR Responsibilities Table
Appendix C	Inter-governmental Agreement
Appendix D	Transfer Form
Appendix E	Search Urgency Form
Appendix F	Missing Person Questionnaire
Appendix G	Object Questionnaire
Appendix H	Land SAR Checklist
Appendix I	Lost Person Behaviour
Appendix J	Land SAR Planning Tables
Appendix K	Additions to Naismith's Rule
Appendix L	Probability of Detection
Appendix M	Mattson Consensus Worksheet
Appendix N	Organisational Chart
Appendix O	Field Search Headquarters Layout
Appendix P	Communications Net
Appendix Q	Clue Recognition
Appendix R	Task Sheet
Appendix S	Whiteboards

Glossary

A	Area
ADF	Australian Defence Force
AMSA	Australian Maritime Safety Authority
A/SMC	Assistant Search and Rescue Mission Coordinator
ATSB	Australian Transport Safety Bureau
C	Coverage
DACC	Defence Aid to the Civil Community
ERD	Emergency Response Division (Part of AMSA)
FLIR	Forward Looking Infra Red Radar
FSH	Field Search Headquarters
Ft	Feet
GPS	Global Positioning System
ICAO	International Civil Aviation Organisation
IMO	International Maritime Organisation
IPP	Initial Planning Point
JOSS	Joint Operations Support Staff
Km	Kilometre (1000 metres)
Kph	Kilometres per hour
LKP	Last Known Position
LO	Liaison Officer
LPB	Lost Person Behaviour
MHz	Mega Hertz
MP	Missing Person
NOK	Next of Kin
PLS	Position Last Seen
PLB	Personal Locating Beacon
POD	Probability of Detection
POM	Period of Mobility
PPE	Personal Protective Equipment
RCC	Rescue Coordination Centre
ROW	Rest of the World
S	Track Spacing
SAR	Search and Rescue
SES	State Emergency Service
SH	Search Headquarters
SITREP	Situation Report
SMC	Search and Rescue Mission Coordinator
SOP	Standard Operating Procedure
SRR	Search and Rescue Region
T	Time
TFFS	Time Frame for Survival
TL	Team Leader
USAR	Urban Search and Rescue (Collapsed buildings)
V	Velocity
W	Corrected Sweep Width
Wu	Uncorrected Sweep Width

Chapter One - Search and Rescue System

Part A - Organisation and Coordination – The National SAR Plan

- 1.01. Aim:** To locate and save the lives of missing persons and to locate missing objects.
- 1.02. Global SAR Organisation and Arrangements:** The International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) coordinate, on a global basis, member States' efforts to provide search and rescue (SAR) services. Briefly, the goal of ICAO and IMO is to provide an effective worldwide system, so that wherever people sail or fly, SAR services will be available if needed. The overall approach a State takes in establishing, providing and improving SAR services is affected by the fact that these efforts are an integral part of a global SAR system.
- 1.03.** Search and rescue services are defined as the performance of distress monitoring, communication, coordination and search and rescue functions, including provision of medical advice, initial medical assistance, and medical evacuation, through the use of public and private resources including cooperating aircraft, vessels and other craft and installations.
- 1.04.** In providing assistance to persons in distress and to survivors of SAR incidents, member States shall do so regardless of the nationality or status of such person or the circumstances in which that person is found.
- 1.05.** Under this global approach, Australia has taken responsibility for the coordination of SAR in the Australian Search and Rescue Region (SRR). RCC Australia in Canberra is the Rescue Coordination Centre (RCC) responsible for the SRR. There are no designated rescue sub-centres (RSC) within the Australian SRR.
- 1.06. National and Regional SAR System Organisation:** Australia, by being party to the Safety of Life at Sea (SOLAS) Convention, the International Convention on Maritime Search and Rescue, and the Convention on International Civil Aviation, has accepted the obligation to provide aeronautical, maritime and land SAR coordination and services for its territories, territorial seas, and the high seas within its SRR.
- 1.07.** Australia, in acceding to the International Convention on Maritime Search and rescue, 1979, noted that the implementation of the treaty throughout Australia would be effected by the Commonwealth, State and Territory authorities having regard to their respective constitutional powers and arrangements concerning the exercise of their legislative, executive and judicial powers. The responsibilities of the authorities are set out in the relevant following paragraphs
- 1.07.** Australia has established a national SAR organisation that involves Commonwealth, State and Territory authorities and organisations: The Australian Maritime Safety Authority and the Australian Defence Force at the Commonwealth level; and the relevant police service or force at the State and Territory level, are the relevant SAR Authorities within Australia.
- 1.08.** The Inter-Governmental Agreement (IGA) on National Search and Rescue Response Arrangements signed by the responsible Commonwealth, State and Territory Ministers is at Appendix C. In accordance with the IGA Commonwealth and State and Territory search and rescue authorities shall each provide, without charge unless otherwise agreed, such assistance or facilities as reasonably may be requested by the authority with overall coordination. A SAR authority that hires or requisitions privately owned facilities for a SAR operation shall, unless otherwise agreed, bear any costs of hiring or payment of compensation for such requisitioning.
- 1.09.** Chapter 1 Part A "*Organisation and Coordination – The National SAR Plan*" of the *National Search and Rescue Manual* constitutes the *National Search and Rescue Plan for Australia*.
- 1.10. Australian Maritime Safety Authority (AMSA):** In accordance with Annex 12 of the Convention of International Civil Aviation, the Commonwealth Government, through the

- Australian Maritime safety Authority (AMSA), accepts responsibility for the provision of Search and Rescue Services for civil registered aircraft in Australia's SRR. The meaning of civil registered is taken to include those aircraft on the VH register managed by the Civil Aviation Safety Authority (CASA) and on the Recreational Aviation Australia (RAA) register which the RAA manages on behalf of the CASA. The responsibilities for the coordination of Aviation SAR response is exercised by RCC Australia on behalf of AMSA.
- 1.11.** The Commonwealth Government through AMSA, in accordance with the Safety of Life at Sea (SOLAS) Convention and the International Convention on Maritime Search and Rescue, accepts responsibility for the coordination of maritime SAR for all classes of ships other than those for which the States/territories and the ADF are responsible. These responsibilities are exercised through RCC Australia on behalf of AMSA.
- 1.12.** RCC Australia is staffed continuously and is responsible for:
- a. coordinating SAR in respect of civil registered aircraft;
 - b. coordinating maritime SAR for all classes of ships other than those for which the States/Territories and ADF are responsible;
 - c. managing the Australian Mission Control Centre (AUMCC) for the Cospas-Sarsat distress beacon locating system;
 - d. operation of the Australian Ship reporting System (AUSREP)
 - e. promulgation of Maritime Safety Information (MSI);
 - f. provision of information on maritime activities such as oil pollution, offshore mineral exploration and dumping at sea.
 - g. Providing assistance to other Australian SAR agencies to fulfil their obligations; and
 - h. Providing assistance to other Australian emergency- response authorities to enable them to meet their obligations in regard to SAR.
- 1.13.** State and Territory Governments: Police are the SAR Authorities in each State and territory. The Australian Federal Police is the SAR Authority for the Australian Capital Territory, the Jervis Bay territory and other populated Commonwealth territories.
- 1.14.** State and Territory Police Services/Forces are responsible for coordinating SAR in respect of:
- a.
 - (i) persons on land;
 - (ii). Persons and vessels on inland waterways and in waters within the limits of the ports of the relevant State/Territory;
 - (iii). Fishing vessels, pleasure craft and commercial and charter vessels that fall under the State/Territories jurisdiction, within port limits or at sea and;
 - (iv). Aircraft not included on the CASA and AUF registers including ultra lights, para-gliders and gyrocopters; and
 - b. coordinating land searches for:
 - (i). missing registered civil aircraft in support of AMSA
 - (ii). Manned space vehicles
 - (iii). Identified and unidentified distress beacon alerts in a land environment.
- 1.16.** Whilst the Police are the responsible authority for land SAR they can be assisted by:
- a. State Emergency Services: The SES will provide man power and equipment to enable SAR operations to be carried out. The level of experience and equipment available will vary between States and individual SES Units. A SMC should be familiar with their local SES Units and their capabilities.
 - b. Other Volunteer Groups.
 - c. RCC: While RCC is predominantly concerned with marine and air SAR incidents they can be approached to:
 1. provide assistance to other Australian SAR agencies to fulfil their obligations particularly with the coordination of multiple air assets; and

2. providing assistance to other Australian emergency-response authorities to meet their obligations in regard to SAR.
 - d. Australian Defence Force: Under the current DACC arrangements the ADF can be approached to provide assistance, under certain circumstances, to the police in SAR operations.
- 1.17. Australian Defence Force – Military SAR:** The Commonwealth Government, through the Australian Defence Force (ADF), is responsible for the provision of SAR for all ADF and visiting military ships, personnel and aircraft. This responsibility is exercised through the respective components of the ADF: Maritime (Fleet headquarters - FSH), Land (Land Headquarters - LHQ) and Air (Air Operations Centre - AOC) respectively.
- 1.18.** Headquarters Joint Operations Command (HQJOC) is responsible for managing and coordinating all of the ADF's operations on behalf of Deputy Chief Joint Operations (DCJOPS). HQJOC is RCC's principal point of contact with Defence on SAR matters. The following arrangements apply in the Australian SRR.
- 1.19.** DCJOPS is responsible to the Chief of the Defence Force (CDF) for the conduct of all ADF Operations. DCJOPS exercises this responsibility through his Headquarters (HQJOC). If a SAR for a unit assigned to an ADF operation is required, the appropriate Headquarters (Maritime, Land or Air) normally remains responsible as the SAR Authority and coordinates the SAR. HQJOC will remain involved as a conduit for information flow to Government and civil SAR Authorities. If an ADF person or asset is not conducting activities in support of an ADF operation, then the following arrangements apply.
- 1.20. Navy:** Navy is the SAR authority for ADF and visiting military ships, submarines and ship-borne aircraft. The Maritime Commander exercises that responsibility on behalf of the Chief of Navy.
- 1.21. Army:** Army is the SAR Authority for ADF and visiting military forces in a land environment. The Land Commander exercises that responsibility on behalf of the Chief of Army.
- 1.22. Air Force:** Air Force is the SAR authority for all ADF (including all Army and land based Navy helicopters) and visiting military aircraft, other than ship-borne aircraft. The Air Commander exercises that responsibility on behalf of the Chief of Air Force.
- 1.23. Commander Northern Command (COMNORCOM):** When military SAR occurs within Commander Northern Command's (COMNORCOM) area of responsibility, COMNORCOM is usually appointed in command of the SASR incident and Headquarters NORCOM is designated as the SAR Mission Coordinator (SMC). Appropriate military forces are allocated to COMNORCOM by the respective Headquarters (Maritime, Air or Land) so that COMNORCOM can conduct the SAR. The relevant single service headquarters (FSH, LSH or AOC) remains the SAR authority. There may be occasions when Maritime, Land and Air Headquarters choose to retain SAR operations command and SMC responsibilities.
- 1.24. Air Services Australia:** All Air Traffic Services (ATS) units, as a function of their alerting service responsibilities, have a responsibility for the declaration of SAR phases for aircraft, to classify the severity of emergencies and alert RCC Australia.
- 1.25.** In addition, all ATS units are required to act as intermediaries between persons reporting an aircraft in need of assistance and RCC Australia.
- 1.26.** ATS units are responsible for providing in-flight emergency response (IFER) services. ATS units are required to refer incidents likely to culminate in a forced landing, ditching or crash to RCC Australia at the earliest opportunity.
- 1.27.** The extent that their traffic responsibilities allow, ATS units are required to provide communications between the search aircraft and the responsible SAR Authority. This normally involves the relay of requests, instructions and information between the responsible RCC and aircraft.

- 1.28. **Other Commonwealth Agencies/Authorities:** A number of Commonwealth organisations have a special interest in emergency operations; they provide helpful ancillary services, or have SAR facilities that may be of assistance in special cases.
- 1.29. **Bureau of Meteorology:** Provides routine or special weather forecasts, wind history and a description of past and present weather reports
- 1.30. **Emergency Management Australia (EMA):** The Commonwealth Government, through Emergency management Australia (EMA), is responsible for coordinating any Commonwealth assistance to States/Territories following natural or technological disasters. The National Emergency Operations Centre (NEOC) in Canberra exercises this responsibility.
- 1.31. State/Territory Governments have constitutional responsibility, within their borders, for coordinating and planning for the response to natural or technological disasters and civil emergencies. When the total resources (Government, community and commercial) of an affected State/Territory cannot reasonably cope with the needs of the situation, the State/Territory Government can seek assistance from the Commonwealth Government through EMA.
- 1.32. **Border Protection Command:** Border Protection Command (BPC) is a joint ADF and Australian Customs agency that coordinates and manages the Australian Civil Surveillance Program and may provide assets to assist during SAR incidents.
- 1.33. In accordance with IMO directive MSC/Circ. 1073, BPC is the Australian Security Forces Authority (SFA) with responsibility for providing the response to acts of violence against ships.
- 1.34. **Australian Communications and Media Authority:** The Australian Communications and Media Authority (ACMA) regulate the use of radio frequencies and may assist with direction finding services. ACMA also issues and maintains a database of maritime call sign allocations to Australian holders of maritime radio licences.
- 1.35. **Australian Transport Safety Bureau (ATSB):** The ATSB is responsible for investigating accidents and incidents involving certain transport services in Australia. Australian SAR Authorities may have responsibility for notifying ATSB of accidents or incidents. ATSB can provide SAR Authorities with information about the location of past aircraft crash sites, which can be useful in identifying wreckage located during search actions.
- 1.36. **Civil Aviation Safety Authority (CASA):** CASA sets aviation safety regulatory standards affecting the civil aviation industry. CASA can provide advice on aircraft and pilot performance, safety matters and maintain the Aircraft Register.
- 1.37. CASA through the Office of Airspace regulation (OAR) is responsible for the declaration of restricted or Danger Areas during SAR operations when appropriate.
- 1.38. **Volunteer Organisations:** Volunteer rescue organisations are located throughout the country and their focus is primarily one of promoting safety and carrying out local rescues. The State or Territory Police Service/Force retains overall coordination and control of operations conducted by the volunteer organisations during land search and rescue operations.
- 1.39. **Commercial and Private Organisations:** There are certain commercial and private organisations that are capable of providing assistance during land SAR incidents.
- 1.40. Some of these organisations have facilities that are immediately suitable for use as SAR units, such as the government or community provided rescue helicopters; others have facilities that have been adapted by way of providing them with extra equipment or training.
- 1.41. Civil units considered suitable for the provision of land SAR services are described as Search and Rescue Units (SRU's). These units are trained in search and rescue techniques and include groups such as the SES, Federated Mountain Rescue (FMR) and other state equivalents. These groups will provide search teams as appropriate.

- 1.42. Aircraft and marine craft in transit may be able to assist in cases of distress within their area of operations. Commercial towing and salvage companies may provide vessels to take over towing or salvage of a vessel that is no longer in immediate danger. The owner or agent of the disabled vessel usually makes arrangements for these services. SAR units should not interfere with this form of private enterprise providing the commercial facilities are capable of completing the operation safely.
- 1.43. Other organisations that might volunteer to assist in a land SAR operation include general aviation operators, oil and mine companies, fishing companies, aero clubs and mission stations.
- 1.44. **SAR Coordination – Overview:** There are two levels of SAR response in Australia:
 - a. The Commonwealth level through AMSA (RCC Australia and the ADF; and
 - b. The State/Territory level through the Police
- 1.45. Volunteer organisations work in close liaison with State/Territory Police and the Police retain overall coordination of these organisations within their jurisdiction.
- 1.46. It is common for a number of SAR authorities to contribute to one SAR operation. Therefore it is vital that one SAR authority is responsible for the overall coordination of the SAR operation and the other authorities involved will cooperate to produce the best response possible within available resources.
- 1.47. **Determination of SAR Authority responsible for Overall Coordination:** The fundamental aim of a SAR System is to provide assistance to persons in distress. To achieve this aim the SAR System has to locate, support and rescue persons in distress in the shortest possible time. The success of the SAR response therefore depends on the speed with which the SAR situation is evaluated and the SAR operation is planned and carried out.
- 1.48. To ensure the SAR response is successful there are certain principles of SAR coordination that must be observed.
- 1.49. **Initial Response:** The first SAR Authority to become aware of a SAR incident is obliged to respond until overall coordination can be transferred to the SAR Authority best placed to coordinate.
- 1.50. **SAR Authority best placed to coordinate:** Normally the SAR Authority best placed to be overall coordinator of a SAR incident will be the SAR Authority identified in Appendix B as responsible for the target type.
- 1.51. **Note:** Appendix B identifies the responsibilities and functions to a SAR Authority based on the type of target that requires assistance from the SAR service and then additionally, in some circumstances, by the location of the SAR incident. Appendix B also identifies the type of support the various Authorities are expected to provide in a SAR operation. However in certain circumstances, when it becomes apparent, following consultation between the Authorities involved in the incident, that a SAR Authority other than the one specified in Appendix B is more favourably placed to assume responsibility, then by mutual agreement the best placed SAR Authority will assume or maintain overall coordination responsibility. The circumstances may include better communications, closer proximity to the search area, better access to sources of intelligence, expertise in specialised areas or more readily available facilities. For example, RCC Australia is normally best placed to coordinate wide area air searches and coordinate search and rescue operations at sea at long range. These operations may also involve requests for ADF assistance. Police Forces are normally best placed to coordinate local ground searches or inshore boat searches.
- 1.52. A SAR Authority may not be better placed if it is already engaged in responding to another SAR incident/s or it does not have sufficient resources to be able to coordinate effectively.
- 1.53. The SAR Authority with overall coordination may request assistance from another SAR Authority. In such circumstances the Overall Coordinator may delegate to another SAR Authority responsibility for a specific part of the SAR operation.

- 1.54. From time to time, a SAR operation may be commenced independent of a SAR Authority. Once a SAR Authority is alerted to the incident it is their responsibility to coordinate the activities of the responding assets in order that the integrity of the search is maintained.
- 1.55. **Effective consultation and coordination:** In order to ensure the successful prosecution of a SAR incident involving more than one SAR Authority, the SMC with overall coordination shall initiate consultation with all participating SAR Authorities at the commencement of the incident. The SMC should conduct frequent reviews of the progress of the incident and produce a SITREP at regular intervals. This should not preclude all participants offering advice and suggestions.
- 1.56. All SAR Authorities have specialised knowledge within their specific area of expertise and operation, therefore the SMC should consult with other authorities to establish what assistance is available.
- 1.57. **Coordination of Police Land Search:** A transfer of responsibility between SAR authorities may be effected either by the initiating SAR authority inviting another SAR authority to take over or by another SAR authority offering to take over. As Police always retain responsibility for land SAR incidents, transfer will only be possible between Police Services/Forces for incidents that occur on State Borders. Police can not transfer responsibility for land SAR incidents to RCC. Land SAR Incidents involving military personnel may be able to be transferred to the ADF under certain circumstances. However, RCC Australia may provide support on request in accordance with the procedures stated below in "AMSA Assistance to other SAR Authorities."
- 1.58. **Cooperation with Foreign Coordination Centres:** When the area of SAR operations is near or straddles the boundaries between international SRR's RCC Australia is to be informed and will take overall coordination, except for SAR involving military forces as previously discussed. RCC Australia will liaise with neighbouring foreign RCC's in accordance with the relevant International SAR Arrangements. In general, the following procedures reflect the SAR Arrangements in place.
- 1.59. When the position of a party in distress is known, the responsibility for initiation of SAR action will be that of the international RCC in whose SRR the party is located.
- 1.60. The International RCC to assume responsibility for conduct of a SAR action when the distressed craft's position is unknown shall be the RCC responsible for:
- the SRR in which the craft was operating according to its latest reported position; or
 - the SRR to which the craft was proceeding if the last reported position was at the boundary of two SRR's; or
 - the SRR to which the craft was destined if it was not equipped with suitable two-way radio communication equipment or not under obligation to maintain radio communication.
- 1.61. If, after a SAR action has been initiated, it is determined that the area of probability lies across the boundaries of two or more adjoining SRR's, the initiating RCC shall normally remain the responsible SAR Authority.
- 1.62. Alternatively, where search areas are extensive, it may be agreed that RCC Australia coordinates search efforts in the Australian SRR and the adjacent international RCC coordinates search efforts in the foreign SRR. Should this be considered the preferable strategy, RCC Australia may initiate the proposal to its foreign counterpart.
- 1.63. **Provision for entry of foreign aircraft during SAR Operations:** RCC Australia shall take responsibility for organising the entry into and departure from the Australian region of foreign aircraft engaged in SAR operations. If another SAR Authority becomes aware of a foreign aircraft being tasked to conduct SAR operations in the Australian region, they should inform RCC Australia immediately who will organise approvals and diplomatic clearances as necessary.

- 1.64. Requests for Assistance from Foreign RCC's:** RCC Australia or the department of Foreign Affairs and Trade (DFAT) may receive requests from foreign RCC's for Australian assistance in SAR operations. If requests are received via DFAT, RCC Australia shall immediately establish communications with the RCC responsible for the area to establish and arrange any assistance that may be required.
- 1.65. Distress beacons:** As the COSPAS-SARSAT Mission Control Centre for Australia, RCC Australia will normally receive distress beacon activations first. RCC Australia will advise other relevant SAR Authorities of an alert as soon as practicable because they may be:
- coordinating a response already and have more information;
 - the responsible authority in accordance with Appendix B; or
 - in a position to assist in a SAR response.
- 1.66.** In accordance with the principles of SAR coordination RCC Australia will initiate a SAR response and retain overall coordination responsibilities until intelligence has established the location of the distress beacon, and nature of the distress, the responsible authority has been identified and agreement has been reached on the best placed SAR Authority to assume overall coordination.
- 1.67.** Distress beacon alerts will be prosecuted until the beacon is deactivated to prevent interference with other incidents on the distress frequency.
- 1.68. Transfer of Coordination – Reasons for transfer of coordination:** The SAR Authority with overall coordination should evaluate all available information and intelligence and make an initial assessment of the probable search area and assets required. If the required response is assessed as being beyond the capacity of the Authority then that authority should request assistance at an early stage. Delaying requests for assistance, may lead to reduced chances of survival and/or significant increase in the size of the search area.
- 1.69.** Overall coordination responsibility may be transferred from one SAR Authority to another within Australia's SRR in the following circumstances:
- 1.70.** Where a SAR Authority has activated a SAR operation in response to a distress or other emergency situation that is found to be outside their responsibility.
- 1.71.** For example, a SAR operation is mounted by RCC Australia in response to a distress beacon activation that is, after investigation, found to be a land environment incident or a pleasure craft/fishing vessel in distress. In such case RCC Australia, depending on the operational circumstances of the SAR response, may transfer overall coordination of the SAR operation to the responsible State/Territory Police.
- 1.72.** When an RCC is fully committed, overall coordination of a further incident in that region may be transferred to an adjacent RCC:
- Whenever more accurate knowledge of the distressed craft's position or movements comes to hand.
 - When it becomes apparent that a SAR authority other than the one initiating the action is more favourably placed to assume responsibility.
 - Where a SAR operation is beyond the State/Territories capabilities. This might include situations where vessels that come under the jurisdiction of a State/Territory are well to sea or along a remote part of the Australian coastline and beyond the capabilities of the SAR facilities available to the State/Territory.
 - Where the circumstances of the SAR operation requires the implementation of the State or Territory disaster plan or the declaration of a State or Territory Emergency. For example, an aircraft incident where there are many fatalities and/or injured. In these cases, once appropriate State/Territory resources are on site, the appropriate State/Territory authority will assume overall coordination of the operation.
- 1.73.** For a major search where RCC Australia has assumed overall coordination from a State/Territory SAR Authority and the air search has been completed but local land and

- inshore operations may continue, overall coordination may be transferred back to the appropriate State/territory.
- 1.74. Transferring Overall Coordination:** Any transfer of responsibility of overall coordination for a SAR operation between SAR Authorities will be by mutual agreement. Following a transfer of overall coordination, the initial authority will continue to provide support as it is able within the capabilities.
- 1.75.** A Transfer of responsibility between SAR authorities may be effected either by the initiating SAR Authority inviting another SAR Authority to take over or by another SAR Authority offering to take over. In either case, the following procedures shall apply:
- consultation shall take place between the SMC's of both authorities.
 - Full details of all known information relating to the incident and actions taken or contemplated by the initiating centre shall be passed. If verbally, confirmation will be sent in a message.
 - If overall coordination cannot be accepted immediately, the initiating SAR Authority shall retain responsibility until a mutually agree time of transfer.
 - The formal handover/takeover shall be recorded in writing by both SMC's using the Transfer of SAR Coordination form (Appendix D), and
 - Any other assets or authorities concerned shall be advised of the takeover.
- 1.76.** Accepting overall coordination from another SAR Authority: Where a SAR Authority wishes/requires to transfer overall coordination, the accepting SMC shall ascertain from that SAR Authority the reasons for seeking to transfer overall coordination.
- 1.77.** In taking coordination for the SAR event, it is essential that the accepting SMC is aware that SAR assistance from the (current) Coordinating SAR Authority may not be available depending on the reason for the transfer of overall coordination.
- 1.78.** Where a SAR Authority accepts overall coordination of an incident, the SMC shall ensure that full responsibility for the event is accepted, in which case:
- the accepting SMC shall ensure that all aspects, including air and surface search, are coordinated by their RCC,
 - a Transfer of Coordination for shall be completed and exchanged.
 - If an aspect of the search (e.g. surface search) is to be coordinated by, or remain with another SAR Authority, then terms for the coordination shall be made clear and that Authority shall be required to report progress and keep the SMC with overall coordination informed as to developments.
- 1.79.** On completion of the SAR event, if it is appropriate to consider transferring the event back to the original coordinating SAR Authority, the SMC shall establish that the operational limitations for the earlier transfer of coordination no longer exist.
- 1.80. Accepting coordination for a component of the SAR event from another SAR Authority:** Where an Authority decides to accept coordination for a component of an event (e.g. air search) from another SAR Authority, the accepting SMC shall ensure that responsibility for specific functions (e.g. air search) is accepted, in which case:
- the accepting SMC shall operate within the terms of the agreed responsibility and report progress to the SAR Authority with overall coordination; and
 - conduct the specific functions in accordance with accepted standards, procedures and practices.
- 1.81. Guidance in support of transferring coordination of a component of a SAR operation:** Where the overall coordinator needs or requires another cooperating SAR Authority to take responsibility for a component of a SAR event or a specific activity in the SAR event the Cooperating Authority must be provided with:
- clear objectives, scope and scale of the delegated responsibility and service required,

- b. full briefing on the SAR event to the extent that it will affect the service to be provided;
 - c. conditions and constraints on use of assets;
 - d. time requirements and constraints;
 - e. tactical intelligence, information and data as it becomes available that may affect the progress of the support service provided.
- 1.82. The Cooperating Authority must:
 - a. accept, or reject the proposed delegation. If the action is other than to accept the delegation, then the Coordinating Authority must be informed of the operational reasons;
 - b. operate within the terms of reference for the supporting service;
 - c. inform the Coordinating Authority of any circumstances, if they arise where the specified service cannot be provided or needs to be varied, together with reasons;
 - d. exchange with the Coordinating Authority, tactical intelligence, information and data as it becomes available that may affect the progress of the SAR event; and
 - e. report progress of the support activity to the Coordinating Authority.
- 1.83. **Transfer of coordination after suspension of SAR action:** When a SAR action is suspended, the authority with overall coordination at the time shall inform all authorities, units and facilities that have been activated and/or alerted.
- 1.84. If, at the time of suspension, the search is under the overall coordination of the Authority responsible for the target type, as identified in Appendix B; overall coordination shall not be transferred to another SAR authority. Rather, the Police, and other SAR agencies, should be informed that search has been suspended pending the availability of further intelligence. The Police may then instigate further Police (non SAR) actions as appropriate.
- 1.85. Where a search is suspended for a target that another SAR authority has responsibility for under the terms of Appendix B, SAR coordination shall be transferred to that authority. The expectation would be that if further intelligence is received that indicates the search should be re-commenced, the SAR authority that has functional responsibility will consider its capability to coordinate the search at that time and either retain coordination, seek assistance or transfer coordination. Also, it may be necessary for that authority to fulfil their coronial or missing person responsibilities.
- 1.86. On occasions, after the suspension of a search, it may be necessary for State/Territory Police to continue to search for bodies or aircraft/vessel wreckage. In such cases RCC Australia may:
 - a. provide briefings on flight path prior to disappearance, crash point, area searched and related intelligence;
 - b. review intelligence to assist search;
 - c. source aircraft for transport or search purposes;
 - d. brief search crews on (a) above; and
 - e. provide drift information.
- 1.87. RCC will not fund air or surface assets for the search for bodies or aircraft/vessel wreckage once the search has been suspended.
- 1.88. Should any other organisation, eg. the operating company, wish to continue an independent search, the SAR Authority with overall coordination should ascertain whether there is any new intelligence that indicates that the search should be continued. If there is:
 - a. new intelligence then this should be evaluated and, if considered valid, the search should be continued/re-initiated;
 - b. no new intelligence then the Police/RCC may assist the requesting organisation with:
 - c. briefings on MP behaviour and intentions, LKP, area searched and related intelligence.

- 1.89.** RCC will neither fund nor provide air or surface assets for continuation of the search unless the request is supported by new intelligence.
- 1.90. AMSA Assistance to Other SAR Authorities:** Australian SAR authorities may, and should not hesitate to seek assistance from RCC Australia during a SAR operation. Where resources are available, RCC can deliver a range of services as follows.
- 1.91. Provision of Subject Matter Expertise and Advice:** RCC personnel are experienced SAR operators who can offer advice on the prosecution of a SAR operation. The RCC has a range of SAR planning, prediction and management tools, including drift calculations, that can be utilised at any stage of the search.
- 1.92. Briefing for Air Assets:** A coordinating SAR agency can request RCC Australia to prepare a briefing for a SAR Air Assets. RCC Australia will:
- Prepare the briefing and fax it to the coordinating SAR agency for the crew; or
 - Prepare the briefing and fax it direct to the crew, copied to the coordinating SAR agency.
- 1.93. Sourcing of aircraft:** RCC Australia can identify suitable aircraft to conduct a search on request from a coordinating SAR authority and pass the details to the agency. If the aircraft are tasked by the coordinating SAR agency that agency will bear the costs of the aircraft.
- 1.94. Tasking of aircraft:** If the Coordinating SAR Authority is coordinating a search, and requests RCC to identify and brief an air asset or air assets, the Coordinating SAR Authority will nominate the search area and RCC will then arrange suitable aircraft and brief them. Briefings will be copied to the Coordinating SAR Authority.
- 1.95.** All subsequent activities that are related to monitoring progress of the air search, reaction to intelligence and re-allocation of aircraft to modified search allocations would remain with the Coordinating SAR Authority.
- 1.96.** If the coordinating SAR Authority uses the aircraft, that authority bears the costs for the aircraft.
- 1.97. Coordination of an air search:** The coordination of a police land-based search cannot be transferred to RCC Australia. However, RCC Australia may provide support on request in accordance with the procedures defined below. On request, RCC Australia can take responsibility for an air search in support of a SAR operation under the overall coordination of State or Territory Police. The following principles will apply:
- The search area will be determined by mutual agreement between the coordinating State or Territory Police and RCC Australia.
 - When additional intelligence is received that may entail changes to the search area, the revised search area will be determined by mutual agreement between the State or Territory Police and RCC.
 - RCC will conduct the complete air search including aircraft allocation, crew briefing and de-briefing, air asset performance monitoring and intelligence analysis.
 - All aircraft allocation details will be copied to the Coordinating State or Territory Police.
 - The State or Territory Police and RCC will exchange search area information and intelligence to ensure that coordination of the event is effectively achieved.
 - When the air search has been completed (the search area has been searched to an acceptable POD, there is high confidence that if the target was in the search area it would have been found, and probability of survival time has been exceeded) the air search will be suspended pending the availability of new intelligence.
 - Requests to extend or continue the air search must be supported by the presence of new intelligence. If the air search is continued for other reasons, the costs of that continuation will be borne by the State or Territory Police and not RCC.
 - AMSA will pay all costs for the air search.

- 1.98.** A completed *Request for RCC Assistance* form shall be used to support all requests for RCC assistance.
- 1.99. Civil Requests for Military Assistance - Localised Emergency Assistance to Save Life:** In localised emergency situations when immediate action is necessary to save human life, the RCC/local SAR Authority may request assistance directly from the commander of an ADF unit on scene or in the area. In these circumstances ADF commanders are authorised to provide assistance from within their unit's resources to civil agencies. Searches for persons in a land environment are categorised as Defence Assistance to the Civil Community (DACC) Category 1.
- 1.100.** Whenever this action is taken the SMC shall advise RCC as soon as possible, and the commander of the ADF unit will advise their superior Headquarters as soon as possible. RCC is to follow up with a courtesy call to the appropriate single service operational headquarters and HQJOC.
- 1.101. All Other Requests for Defence Assistance:** In other than the circumstances described above, civilian SAR Authorities/SMC are to pass requests for ADF assistance to RCC who will liaise with Headquarters Joint Operations Command (HQJOC). Once a military asset has been assigned, further contact can be with the Service concerned. RCC will contact the appropriate military unit to discuss with the mission commander/crew an appropriate search tasking for the asset.
- 1.102.** The preferred means for passing requests from RCC to the ADF for SAR assistance is via high precedence DISCON messaging. A second copy will also be sent by facsimile as a back up. Requests are to include as much detail as possible about the search target, where assets are required, how long assets are likely to be required, what other search assets are in the area, who is the coordinating SAR Authority, what logistic support can be provided to the ADF and the relevant points of contact.
- 1.103.** Any verbal request will be followed by a hard copy message.
- 1.104. Military Requests for Civil Assistance:** In localised emergency situations when immediate action is necessary to save human life, ADF authorities will liaise directly with local State or Territory Police for the provision of civil support to ADF SAR operations.
- 1.105.** In other than immediate, life threatening circumstances, the ADF will pass requests for civil SAR assistance in support of military SAR operations to RCC for on forwarding to the appropriate civilian SAR Authorities/SMC and the facilitation of the provision of support.

Part B - Management and Support - SAR Management

- 1.106. Overview:** There are three levels of management within the Australian SAR system.
- Overall management of SAR responsibilities by SAR Authorities;
 - Management of individual SAR incidents by SAR mission coordinators (SMC's); and
 - Direction of SAR activities at an incident by On-Scene Coordinators (OSC) specifically designated by the SMC.
- 1.107.** This section outlines, in general terms, the management and coordination actions required when a decision is made to implement procedures in prosecuting a land SAR.
- 1.108.** Once it is decided to proceed with the action, plans should be enacted for the commencement of search activity with a minimum of delay. Coincident with progressing search activity, is the development of a rescue plan and obtaining and deploying rescue resources to minimise time between survivors' location and their recovery to a place of safety.
- 1.109. SAR Authority:** The State or Territory Police shall ensure that a land SAR operation can be promptly initiated and prosecuted with the efficient use of available SAR resources, until rescue has been completed or until chance of success is no longer a reasonable possibility.

- 1.110.** SAR Authorities have the overall responsibility for establishing, staffing, equipping and managing the SAR system, including providing appropriate legal and funding support, establishing Field Search Headquarters (FSH's), providing or arranging for SAR assets, coordinating SAR training and developing SAR policies, as listed at Appendix B. SAR Authorities will focus upon resources to conduct SAR operations for which they are the Responsible Authority (Appendix B). The SAR Authority, where applicable, shall:
- a. establish a Field Search Headquarters (FSH's) to coordinate all participating search and rescue assets and facilities;
 - b. ensure that the FSH conforms to the SAR procedures contained in this manual or local SOPs and manuals;
 - c. establish close liaison and formulate agreements with other authorities and organisations having SAR potential;
 - d. establish liaison with SAR authorities of adjacent areas to ensure mutual cooperation and coordination in combined operations;
 - e. ensure that a comprehensive and current SAR plan is prepared and distributed;
 - f. establish and supervise communication facilities and assign SAR frequencies from those authorised to assets designated for SAR tasks;
 - g. establish communications with adjoining SAR Authorities and appropriate organisations to ensure two-way alerting and dissemination of SAR information;
 - h. ensure immediate action is taken to provide assistance, advising the appropriate SAR authorities and passing all information received concerning the distress incident and any action taken;
 - i. ensure that the Next of Kin (NOK) of any land party in need of assistance has been advised of initial actions taken, and they are kept informed of all pertinent developments;
 - j. designate an SMC for a specific SAR incident;
 - k. ensure that each incident is prosecuted until assistance is no longer necessary, rescue has been completed or chance of success is no longer a reasonable possibility;
 - l. ensure that if the scope of the operation exceeds the local capacity to plan and execute the operation, the FSH shall seek advice and assistance from their State SAR Coordinator for the provision of assets and/or personnel from other areas.
 - m. maintain and preserve adequate records; and
 - n. develop new and improved techniques and procedures.
- 1.111. RCC Staff:** RCC staff perform duties in the prosecution of search and rescue events'. In addition they have responsibility for maintaining the RCC in a continuous state of preparedness. RCC staff shall consist of personnel who are experienced and/or training in SAR operations. When a period of heavy activity is anticipated or during major SAR incidents, the regular staff may be supplemented as required.
- 1.112.** Authorities and agencies that may be involved in providing services to an RCC in the event of an incident e.g. RCC Australia, State and Territory Police, Air Services Australia, ADF, Bureau of meteorology (BOM) and ACMA are to be alerted as early as practicable so that staffing can be managed.
- 1.113. Search Headquarters (SH):** This is set up by the Search Commander (Normally a Commissioned Officer) who is responsible for co-ordinating the overall search effort. It will normally be at an existing Police Station or Police Headquarters, whichever is appropriate.
- 1.114.** Search Headquarters provides effective support to the Field Search Headquarters.
- 1.115.** All pre-search information is evaluated by the SMC at a convenient location prior to instituting a search. This location may vary from the home of the SMC when the initial call comes through to a police station if the SMC is already on duty. During this stage, there is a danger that rumours and false information may produce an over-reaction and cause organisations and individual volunteers to enter the search area and disturb clues. It is

suggested that the minimum number of searchers, consistent with effectiveness and safety, is most likely to lead to success in a land search and rescue operation.

- 1.116. Initial Actions:** When the Search Commander has made the decision to mount a search, based on the information and advice supplied by the SMC, and a Field Search Headquarters and Support Base have been deployed to the search area, there are positive actions that should be initiated, as follows:
- a. Set up road blocks to contain the search area and to restrict unauthorised movement into the search area.
 - b. Set up an Information/Media Centre to answer enquiries; and keep the public informed through regular media releases.
 - c. Alert the organisations and individuals whose assistance may be required in the search. A pre-planned call-out procedure should achieve this. As a management technique, it is recommended that organisations who form part of the search and rescue resource and who are identified as unlikely to be called-out, be informed of the operation to maintain the enthusiasm of that organisation.
 - d. Despatch personnel and equipment resources to the Support Base, as and when the Field Search Controller requests them.
- 1.117. Field Search Headquarters (FSH):** This should be established by the SMC in or near the search area, as it is from here that search Teams will be briefed and controlled during the operation. When selecting a location for a FSH the SMC shall consider:
- a. Communications.
 - b. Vehicle access and provision of restricting access to public
 - c. Weather conditions
 - d. Electricity or alternatives.
 - e. Amenities or alternatives.
 - f. Assembly area
 - g. Briefing Area
 - h. Staging Area
 - i. Shelter
 - j. Welfare Area
 - k. geographical limitations;
 - l. aerodrome or landing area suitability and proximity to the search area;
 - m. apron capacity;
 - n. refuelling capabilities;
 - o. maintenance and logistical support;
 - p. SAR crew briefing facilities; and
 - r. availability of accommodation in the vicinity..
- 1.118. Assembly Area:** This is a dedicated area near the Field Search Headquarters where all volunteer and search personnel muster prior to briefings and tasking. It ensures that personnel can be located when required and also that the actual headquarters is not inundated with curious personnel trying to see what is going on.
- 1.119. Briefing Area:** At the appropriate time personnel move from the Assembly area to the Briefing area where the SMC or delegate will provide a briefing. This area needs to be large enough for all personnel to see the SMC but small enough that all can hear. It should be away from distractions and outside noises, and be sufficiently lit for night time activities. It should have provision for the display of maps and/or white boards for other information. There are two schools of thought on briefings, the first is to only brief the team leaders, who will in turn brief their individual teams. The second method is to provide the briefing to all searchers and then a more detailed briefing to the team leaders. The second method ensures that all searchers are in the loop and gives them ownership in the mission.

- 1.120. Staging Area:** From the Briefing area personnel will move to the Staging area. At this location personnel will be checked for PPE, water, food and any other equipment considered necessary. This ensures that each team has the necessary equipment to carry out their allotted tasks. The checking will be carried out by senior members of the teams, ie SES Local Controllers. The teams then leave this area to carry out their tasks.
- 1.121.** Upon return teams will go to the staging area where all equipment will be checked and refurbished if necessary. They will then proceed to the Briefing area where the SMC or delegate will debrief the team. The teams then move to the Assembly area for food, water and rest until retasked.
- 1.122. Support Base:** This is not part of, but an essential adjunct to Field Search Headquarters, to ensure that operations in the field receive adequate personnel, administrative and logistic support. It is an area where all resources can be marshalled, organised and brought to a state of readiness against the field search requirements. As there will be considerable movement of personnel, vehicles and equipment, it should not be located in the search area, but should be as close as possible to Field Search Headquarters.
- 1.123. Operations—Staff and duties:** During operations, all headquarters must be run on methodical and systematic lines. In principle, staff should be kept to a minimum and procedures kept simple and easily understood. The following paragraphs deal only with the main requirements, the responsibilities and the staff duties which have to be carried out at the various areas.
- 1.124. Search Headquarters – Location and Command:** Search Headquarters will normally be located in an existing Police Station or Headquarters and the senior Police Officer will be the Search Commander.
- 1.125. Commanders Responsibilities:** Responsibilities include overall planning, organising, assembling resources, directions and controlling personnel and equipment. In reality most of these duties will be delegated to the SMC. The Commander shall command the overall search and ensure:
- a. deployment of the Field Search Headquarters and appointment of the SMC;
 - b. all organisations that may be required to assist are alerted;
 - c. forward planning to obtain the requisites of the search;
 - d. organisation of transport as required;
 - e. that appropriate **ambulance/medical services** are alerted;
 - f. preparation of a comprehensive communications plan to cover the whole operation;
 - g. deployment of personnel and equipment to the Support Base, upon the request of the Field Search Controller;
 - h. appointment of a Media Liaison Officer and setting up of an Information/ Media Centre; and
 - i. setting up of an Assembly Area if required.
- 1.126.** To enable the Search Commander to meet these responsibilities and to consult with representatives of other organisations, Search Headquarters could be organised as follows:
- a. **Operations Room**—In this room, information of an operational nature is received, collated and displayed, and orders issued for the deployment of Services, and consequently, a room of adequate size should be provided to accommodate the Operations Staff. An Operations Room should have a large scale map covering the whole of its area as well as smaller maps of the search area. On the maps will be plotted information as it arrives. It will also require a resources board and message files and log.
 - b. **Communications Centre**—To accommodate communications equipment and to provide facilities for the reception, despatch, filing and logging of messages, it is

desirable there should be separate rooms or divisions for radio, telephone and maintenance. The master register for incoming and outgoing messages is maintained in this section.

- c. **Information/Media Centre**—Wherever a Search Headquarters is established, there will be numerous people seeking and providing information and making enquiries. To cope with this, it will be expedient to establish an Information Centre, clearly marked but some distance from the Headquarters to which such enquiries would be directed. The Media Liaison Officer is responsible for briefing the media.
- 1.127. **SAR Mission Coordinator:** Each SAR operation is carried out under the coordination of a SAR Mission Coordinator (SMC) designated for the purpose by the appropriate State or Territory Police. The role of the SMC may vary between State or Territory Police Services depending on their command arrangements. They must understand the extent of their authority and responsibility and must be capable of taking immediate and adequate action, basing their decisions on knowledge, logic and good judgement.
 - 1.128. **SMC Qualifications:** The SMC must have completed appropriate SAR training and must review and maintain proficiency as per the organisational procedures. The SMC must be capable of performing all SAR functions required by their respective Police Service.
 - 1.129. To fulfil the foregoing requirements, the SMC must have a good knowledge of the communications available, the geographical features of the region, and the capabilities and limitations of SAR assets. The SMC must use initiative and be inquisitive in the search for information, cross-checking the sources in doubtful cases.
 - 1.130. **SMC Responsibility:** The SMC is responsible for efficiently prosecuting a land SAR incident using the assets available. The SMC is responsible for all stages of the SAR system. Their responsibilities include the prompt dispatch of appropriate and adequate SAR assets and the prosecution of SAR operations until rescue has been completed, or chance of success is no longer a reasonable possibility.
 - 1.131. The SMC is responsible for ensuring that the following duties are carried out depending on the land SAR incident and local circumstances:
 - a. Obtaining and evaluating all information pertaining to the incident, including emergency equipment carried by the person, vehicle or craft in distress.
 - b. Classify the SAR incident into the appropriate emergency phase (Uncertainty, Alert/Urgency or Distress)
 - c. Alerting appropriate SAR assets and SAR organisations that may be of assistance during the incident.
 - d. In consultation with other SAR Authorities, confirming which authority will exercise overall coordination in accordance with Appendix B.
 - e. Conducting a risk assessment.
 - f. Dispatching SRU's immediately, if situation warrants.
 - g. Conducting initial communications checks. If unsuccessful, making an extended communications search to obtain additional information on the incident, personnel involved and equipment carried by the vessel, aircraft or party in distress.
 - h. Calculating the search area. Preparing optimum plans and promulgating attainable plans.
 - i. Obtaining past/present/forecast weather, drift information and oceanographic conditions if applicable.
 - j. Providing for SAR crew briefing, dispatching of appropriate SRU's, or other assets.
 - k. Organising logistical support for all SAR assets including fuel, food and accommodation, through to the completion of the incident.
 - l. Making arrangements for appropriate communications.

- m. Maintaining a continuous, chronological plot showing, for example sighting and hearing reports, DF bearings, air plot, radar plot, fixes, reports of debris, areas searched or not searched and other intelligence.
 - n. Maintaining a continuous, chronological record or log of the search effort, including actions taken in relation to intelligence, SRU's employed, sorties, hours flown/underway, sightings, leads, results obtained, message traffic, briefing notes, telephone calls, daily evaluation of progress and probability of detection.
 - o. Initiating maritime distress broadcasts or maritime information broadcasts and initiating the alerting of enroute aircraft. Consideration should be given to arranging for announcements to be made over radio and TV networks.
 - p. Arranging communication schedules when and if needed.
 - q. requesting additional SAR assets, as required.
 - r. Exercising overall coordination of SAR assets.
 - s. Maintaining liaison with the next of kin, owner, agent or management of the missing craft or persons.
 - t. Keeping all authorities involved fully advised of SAR incident progress with timely and regular situation reports (SITREP's). SITREP's should be sent in a numbered sequence.
 - u. making recommendations in relation to the continuation or suspension of searches.
 - v. Issuing news media releases on the progress of incidents in accordance with the local SAR organisational procedures and policies.
 - w. Providing debriefs of SRU's, cancel alerts, release SAR assets and organisations involved, and issuing the final SITREP to all concerned.
 - x. Acting as required to cope with unique, unusual or changing circumstances of the emergency.
- 1.132.** Where a SAR Authority has overall coordination of a SAR operation, the SMC shall give particular attention to the following matters as relevant to the search:
- a. In conjunction with the meteorological office, keeping a watch on weather conditions in the probability area, routes used by SAR units in transit to and from the search area and at aerodromes used as bases or alternate aerodromes for search aircraft.
 - b. Coordination of search aircraft in the light of operational conditions by diverting or recalling aircraft or reassigning search areas as conditions dictate.
 - c. Planning so as to minimise conflict between search aircraft in adjoining areas.
 - d. Attending to logistical requirements, in particular, accommodation, fuel, availability of relief crews and observers and all necessary ground facilities at aerodromes to be used by SAR units.
 - e. Coordination of the use of maritime resources and facilities and efficient distribution of message traffic regarding sea state and weather conditions which may affect marine craft engaged in search activities.
 - f. Provision of regular information to those agencies responsible for land search units about actual and forecast weather conditions which may affect their operations.
 - g. Ensure that all search units are kept informed about actions and development affecting their operations.
 - h. Make effective use of personnel from other SAR Authorities, medical agencies, public relations, company representatives and maritime authorities.
 - i. Keeping other authorities, which have been given coordination of search assets, informed of overall search progress and strategy.
- 1.133.** The SMC may have access to other SAR qualified personnel. Some functions may be shared where there are insufficient numbers of staff to allocate individual tasks to a staff member. The following roles are listed for completeness.

- 1.134. Assistant SAR Mission Coordinator (A/SMC)** As the title implies, the A/SMC assists, and is subordinate to, the SMC assigned to a particular SAR mission. The term is used by some Australian jurisdictions to describe officers with SAR qualifications that allow them to provide significant support to the SMC.
- 1.135. A/SMC Qualifications:** Officers performing A/SMC duties should, as a rule, hold SMC qualifications, but requirements vary within the structure of the SAR organisation. Generally, the title A/SMC refers to the SAR qualifications held by a particular officer, e.g. an officer rated as A/SMC may serve in any capacity within the SAR organisation, except in the position of SMC. Officers rated as SMC may, on the other hand, be allocated A/SMC duties. As a general guide, the objective of any SAR organisation should be to ensure that staff employed in the management of SAR operations should be qualified to perform the highest level of duties i.e. SMC.
- 1.136. A/SMC Authority:** The A/SMC is under the direct supervision of the SMC and therefore has the full operational authority of the SMC when carrying out specific duties assigned.
- 1.137. A/SMC Responsibilities and Duties:** The A/SMC is responsible for routine documentation, allocation of SRU's and presentation of the search plan under the direction of the SMC. Each State and Territory Police Service/Force will recognise specific duties applicable to the A/SMC function.
- 1.138. Allocator:** An Allocator is responsible to the SMC for the determination of a probability area, allocation of appropriate surface or air search units to specific areas, and when required brief and debrief search crews.
- 1.139. Recorder:** A Recorder, if required, shall maintain an accurate and up-to-date chronological record of the SAR action, together with other necessary records, messages and details of telephone calls and radio logs.
- 1.140. Briefing Officer:** A briefing Officer shall be responsible for briefing and debriefing search units.
- 1.141. Intelligence Officer:** An Intelligence Officer shall be responsible for:
- liaison with the Bureau of Meteorology for the supply of forecasts and periodic updates of weather information;
 - plotting, assessing and filing of sighting and hearing reports;
 - interrogating witnesses and assessing other reports;
 - obtaining data about the missing persons and/or vehicles;
 - obtaining logistical data relating to the search area;
 - supervising the personnel employed in gathering intelligence.
 - The Intelligence Officer shall immediately advise the SMC of any information that is considered to be significant.
- 1.142. Rescue Planner:** A Rescue Planner shall be responsible for devising and coordinating a rescue plan. The rescue plan shall include the pre-positioning of supplies for an airdrop to survivors and the positioning of suitable rescue facilities at appropriate locations.
- 1.143. Liaison Officer:** Liaison Officers or advisors from other authorities/interested parties, when required, may be sought from or provided by RCC Australia, the aircraft operator, police, military authorities etc. and shall liaise between the RCC and their parent organisation on matters of their specialisation. The use of liaison officers is encouraged during SAR operations that may become protracted.
- 1.144. On Scene Coordinator:** When a number of SAR assets are working together on the same SAR mission in the same location, there may be advantage if one unit is assigned to coordinate the activities of all participating assets. The SMC will designate this role to an On Scene Coordinator (OSC) who may be the person in charge of a ship or aircraft participating in the search or someone at another nearby facility in a position to handle OSC duties. The OSC should be the most capable person available, taking into consideration SAR training, communications capabilities of the asset, and the length of

time that the asset the OSC is aboard can stay in the search area. Frequent changes in the OSC should be avoided. Duties that the SMC may assign to the OSC, depending on needs and qualifications include:

- a. Assuming operational coordination of all SAR facilities on scene
- b. receiving the search action plan from the SMC
- c. Modify the search action plan based on prevailing environmental conditions and keeping the SMC advised of any changes to the plan (in consultation with the SMC when practicable)
- d. Providing relevant information to the other SAR assets.
- e. Implementing the search and rescue plan where required.
- f. Monitoring the performance of other assets participating in the search;
- g. developing and implementing the rescue plan (when needed)
- h. Providing regular SITREP's to the SMC.

1.145. ADF Liaison Officer: A Liaison Officer may be required in situations such as:

- a. The ADF were the SAR Authority in a land SAR incident involving an ADF member and the relevant Police Service/Force were providing assistance.
- b. The State or Territory Police were the SAR Authority and had requested ADF resources under a DACC request.

1.146. The Liaison Officer in both instances would provide a communications conduit between both SAR Authorities and would also be available to provide assistance where necessary.

1.147. Search Team Leaders: During land search operations search teams will be allocated particular search areas. This will normally be done on a one team per area basis but on occasions there may be a requirement for several teams to unit for something such as an extended line search. The TL should be the most capable person within that team. Each Team Leader will be responsible to the SMC for the following:

a. **Prior to the Search:**

- (1) On arrival at the Field Search Headquarters, the Team Leader should report to the SMC and register the team. Registration must include providing a list of names for all team members.
- (2) Ensure that team equipment is checked and any additional or specialised equipment is obtained. This task may be delegated.
- (3) Ensure that the team is fed prior to commencing the search if this is appropriate. A suggested check list for the Team Leader's duties is shown as Annex B to this chapter.

b. **During the Search:**

- (1) Note all information of value including:
 - (a) features on the ground which are not marked on maps;
 - (b) locations of possible helipads;
 - (c) road conditions and access; and
 - (d) names of all persons encountered.
- (2) Meet all radio schedules.
- (3) Control the rate of advance of the team.
- (4) Control the direction of the team.
- (5) Preserve tracks or signs believed to be made by the missing person.
- (6) Maintain liaison with other teams in adjacent search areas.
- (7) Rest the team at appropriate times and rotate special tasks or heavy loads amongst team members.
- (8) Notify the SMC immediately the missing person, object, or important clues are found.

- (9) coordinate the team effort with those in adjacent areas to ensure that the search is completed to the adjoining boundary and with any other specialist search group which may be operating in the area, such as dogs or horses.
 - c. **At the Completion of the Search**—At this point there are a number of duties which must be performed. These include the following:
 - (1) Check-in all team members and assess their physical condition.
 - (2) Close down the radio.
 - (3) Check team equipment.
 - (4) Organise food and drink as necessary.
 - (5) Conduct a thorough debrief of the team and retain the team in the assigned area pending further tasks.
 - (6) Provide the SMC with a report on the completed tasks.
 - (7) Where further search tasks are allocated, obtain the necessary information and brief the team and make necessary preparations to carry out such tasks.
 - (8) Where no further tasks are assigned, advise the team of the return arrangements and timings.
 - (9) Delegate team tasks for return to the home base.
- 1.148. Delegation:** The list of duties for Team Leaders is extensive and need not be carried out by the Team Leader personally. These tasks may be delegated to permit concurrent actions. Delegation however, does not remove the responsibility from the Team Leader to ensure that these duties are completed.
- 1.149. Support Base:** The support base should not be located in the search area but should be as close to the Field Search Headquarters as possible. If the Field Search Headquarters is located outside the search area, then the Support Base may be collocated. Ideally it should have buildings to accommodate Headquarters, stores and welfare facilities, hard standing for vehicles and working space. It is the point of entry into and out of the search area, and as such has a vital role to play.
- 1.150.** It should be clearly understood that it is NOT a rallying point for all those who may wish to help; this can only lead to chaos. Its role is entirely operational, and should only involve such personnel and equipment resources as the SMC requires.
- 1.151. Support Base Supervisor:** This person is responsible for:
 - a. maintaining close contact with Field Search Headquarters and Search Headquarters at all times;
 - b. controlling movement in and out of the search area;
 - c. recording the names and addresses of all those taking part in the search, as well as details of search teams;
 - d. recording the issue and return of all equipment;
 - e. welfare, including food and water, clothing, rest areas etc., for all personnel in the field;
 - f. first aid and sick bay facilities; and
 - g. despatching fully equipped Search Teams and resources to the SMC when requested;
- 1.152.** Operations at the Support Base will be complex, and to ensure its smooth and efficient running, the following will be necessary:
 - a. Support base procedures will require maintenance of the same sort of logs, maps and message filing systems as at Field Search Headquarters. A copying machine could be useful for extra copies of maps etc.
 - b. The maintenance of a resources recording system is of particular importance.
 - c. Records of issues and return of stores and equipment.
 - d. Records of all personnel taking part in the search as directed by SMC.

- e. Reliable communications between the Field Search Headquarters and Search Headquarters.
- 1.153.** The Support Base Supervisor needs to be an experienced organiser and requires sufficient trained staff to undertake the functions of this area.
- 1.154. Information:** Information is an essential requirement in any operation.
- 1.155. Information Classification:** For search operations, information may be broadly classified as follows:
- a. **Pre-Search Information**—As much information as possible must be obtained prior to initiating a search operation. This should include:
 - (1) Relevant information regarding the missing person(s) or object.
 - (2) Weather conditions:
 - (a) at the time the person was reported missing;
 - (b) present weather conditions; and
 - (c) forecast weather conditions.
 - (3) Information regarding the area to be searched including the relevant maps.
 - (4) Personnel and resources available.
 - b. **Search Operational Information**—Based on the pre-search information, a preliminary assessment of the search task can be made. Once the search operation has commenced, reliable and accurate information is required from the search teams. Various methods may be used to obtain this information; search teams may be instructed to send reports at specified times or they may be required to report only when they have significant information to pass on. Regardless of the method decided upon by the SMC, it is vital that all search Team Leaders are briefed in detail on the particular method and their responsibility for providing search operational information.
- 1.156.** After consideration how best to exercise control over SAR assets in remote sectors of a SAR of where communications, administrative or political factors impact on operational efficiency, a SMC may recommend to management to establish a FSH close to the incident. The responsibilities of the OIC of a FSH throughout a particular SAR action shall be delegated by the SMC and may include:
- a. briefing and debriefing members of search teams during a land search operation
 - b. briefing and debriefing search crews operating aircraft from an aerodrome close to the search area.
 - c. Establishment of a base for helicopter operations, not at an aerodrome.
 - d. Coordinating, as required, the provision of safety, survival and SAR equipment to participating SAR aircraft and helicopter.
 - e. Collation of intelligence information and provision of logistical support.
 - f. Liaison between RCC Australia, police and emergency services.
 - g. Supervising the allocation of observers, and ensuring they obtain adequate rest;
 - h. Making arrangements for food, accommodation and transport for search crews and observers when required.
- Notes:**
- 1. Where an aerodrome is to be used for a FSH, the aerodrome operator/owner should be consulted prior to the final decision being made to establish an FSH at the location.**
- 1.157.** In considering the establishment of a FSH, the Search Commander/SMC shall consider communications requirements and existing facilities including terrestrial networks, satellite communication links, mobile phones, facsimile machines and facilities available through other agencies eg. RCC Australia, Police, Defence assets and State/Territory Emergency Services.
- 1.158.** When selecting a location for a FSH the Search Commander/SMC shall consider:

- a. navigation aids;
 - b. geographical limitations;
 - c. aerodrome or landing area suitable and proximity to the search area;
 - d. apron capacity;
 - e. refuelling capabilities;
 - f. maintenance and logistics support;
 - g. SAR crew briefing facilities;
 - h. Availability of accommodation in the vicinity;
 - i. Vehicle access and parking space;
 - j. Logistical availability;
 - k. Location to SAR site;
 - l. Electricity/running water/welfare/toilet facilities;
 - m. Weather shelter; and
 - n. Radio/telephone/communication reception
- 1.159. Search and Rescue Resources:- Overview:** Search and Rescue within the Australian SRR is based on the use of aircraft, marine craft and land facilities which are normally used for other purposes but which can be made available to form part of the SAR effort.
- 1.160.** Each State or Territory Police Service/Force shall be responsible for developing and maintaining a facility register. This register will contain the details of all resources that may be able to assist in the prosecution of a land SAR incident. These details may include:
- a. 24 hour contact details
 - b. Type of personnel/asset (12 SES, 1 Bell 412 Helicopter etc)
 - c. Capabilities of asset (Land Search, Vertical Rescue, Dogs, Diving etc)
 - d. Availability of asset (24/7, after hours etc)
 - e. Any costs involved
 - f. Any lead time required.
 - g. Any restrictions
- 1.161.** The SMC shall arrange for the provision of suitable search units. The terms SAR unit or SAR facility are used to describe one or more types of land and/or air-based facility.
- 1.162.** Some of these facilities are immediately suitable for SAR use; others have been adapted by way of providing them with extra equipment or training. A number of units considered suitable for the provision of SAR services have been designated as specialised SAR units with trained personnel and are described as Search and Rescue Units (SRU's).
- 1.163.** Every endeavour should be made to obtain sufficient search assets to search the determined area at a satisfactory coverage factor in the shortest possible time. However certain factors, such as inclement weather or darkness, may make an optimum air search impractical and the use of surface assets should be considered. Search by land facilities alone is usually impractical for large search areas but it can be conducted in most weather conditions and can provide complete coverage of a confined area that cannot be thoroughly searched from the air. Land parties are also critical in operations where the search is carried out from the air and rescue by land facilities.
- 1.164.** Identification and deployment of rescue units shall commence at the time of the initial SAR response and a review of requirements shall continue through the action.
- 1.165. Personnel:** While a SAR unit will conduct a SAR operation under the general direction of the SMC, the person in charge of the unit will retain the responsibility for carrying out the operation assigned to it.
- 1.166.** Ideally, the best personnel to use in search operations are those who have bushcraft, search technique skills and knowledge. Unfortunately, the number of persons with these skills is limited; therefore it may be necessary to supplement search teams with inexperienced personnel.

- 1.167. Medical personnel should be alerted in a timely manner if it is anticipated that they may be required.
- 1.168. SAR Authorities should ensure that regular training is undertaken by SRU's in their jurisdictions.
- 1.169. **Dropmasters, Dispatchers and Observers:** Many members of the State Emergency Service are trained as Dropmasters, Dispatchers and Observers. Each SMC should be aware of what skills the SES poses as they may be required during a SAR incident.
- 1.170. Dropmasters, dispatchers and observers are an integral part of the SAR team and its effective operation.
- 1.171. Dropmasters will be required if an aerial delivery of stores is to be made to survivors. The dropmaster shall be responsible for the preparation of the equipment for delivery and for briefing the drop team and aircrew on dropping techniques. During the drop mission, the dropmaster will take charge of the aircraft cabin and control the dropping operation. Dispatchers should be available to assist the Dropmaster in the delivery of supplies when required.
- 1.172. Whenever possible, trained Observer Leaders and Observers shall be used in all search aircraft. Where it is inevitable that some untrained Observers must be used, the SMC shall make every effort to have at least one trained Observer Leader or Observer in each search aircraft.
- 1.173. Sufficient Observers should be assigned to large aircraft to enable the Observer Leader to arrange relief periods. Ideally, search sorties should be approximately of two hours duration.
- 1.174. An Observer Leader allocated to an aircraft shall attend the briefing with the pilot or obtain a copy of the briefing, and will then be responsible for briefing Observers allocated to that aircraft. Observer Leaders may be issued with binoculars where available.
- 1.175. Should a prolonged search be foreseen, Observer Leaders and Observers should be rostered to avoid fatigue. If there are insufficient Observers available locally, additional Observers should be obtained and taken to the area.
- 1.176. It is an SMC responsibility, either directly or by delegation from the SAR Authority, to make reasonable provision for and to monitor the welfare of Observers. This includes the provision of refreshments, accommodation and rest breaks. Local SES assets and aero clubs, especially those from which a number of search aircraft may be deployed, may be of assistance in this regard and should be invited to cooperate in making appropriate arrangements.
- 1.177. **Rescue Preparation:** Planning for rescue shall commence at the time of the initial SAR response and continue throughout the action. Plans shall be appropriately updated, as the circumstances require. For further considerations in rescue planning refer to Chapter 6
- 1.178. **Public Relations:** Search and Rescue operations for missing persons, particularly children and the elderly, generate considerable publicity. By virtue of its nature, a FSHQ is a source of news and this is especially true during SAR incidents. The public should be informed during SAR operations, within the limits of confidentiality, of SAR actions. The potential benefits of early release of information include:
 - a. additional information from the public, leading to more effective use of SR resources;
 - b. fewer time-consuming requests from the news media; and
 - c. reduction in inaccurate public speculation about the SAR mission.
- 1.179. FSH staff should be governed by their parent authority's public relations procedures when dealing with the media. It is important that a relationship between the media and an FSH is established such that:
 - a. the media's legitimate interest in an incident of concern and the public's "right to know" is respected;
 - b. information reaching the public is factual and as complete as possible;

- c. the operational functioning of an FSHQ is not prejudiced; and
 - d. benefit is derived from publicity of an incident and from media broadcasts for information made at the request of SAR staff.
- 1.180. Operations involving two or more SAR Authorities:** To avoid confusion in public information it is essential that the overall coordinating authority responsible for the particular SAR action make any news release.
- 1.181.** The following guidelines are recommended for releasing information on operations involving vessels, aircraft or other facilities during joint operations:
- a. Inquiries from the public made to one authority concerning the activities of another authority shall be directed or referred to the authority in overall coordination of the incident.
 - b. Where the ADF is the SAR Authority, the ADF is responsible for issuing information to the public. The ADF is to be consulted before any information is released to the public/media.
 - c. Where ADF assets are involved in supporting a civil SAR, information on the activities of those ADF units is not to be released to the public/media without Defence approval. The appropriate authority to consult in Defence is the Public Relations Officer at HQJOC, MHQ, LHQ or HQAC as appropriate.
- 1.182. Public Relations Officers or Media Officers (PRO/MO's):** SAR Authorities usually have a designated PRO/MO. The PRO/MO, or the officer nominated, should have knowledge of search and rescue and the techniques of disseminating information to the public.
- 1.183.** The authority of the PRO/MO will be covered by organisational policies and procedures. The commercial distribution of news is highly competitive and therefore news releases must be impartial. Specifically, the PRO/MO will perform the following duties:
- a. receive briefings from the SMC, FSH personnel, SITREP's, SAR log and interviews with rescued personnel if available;
 - b. make proper and full use of existing news media such as press, radio, television and wire services to disseminate information;
 - c. establish liaison with media sources early in the mission in order to prevent the SMC from being flooded with requests for information as the mission progresses;
 - d. keep well informed on the procedures and techniques being used in the search and in which stage the SAR system is functioning at any particular time; and
 - e. process and review for news-worthiness all photographs taken of mission activities.
- 1.184. Press Releases:** The early release of information will frequently aid in preventing time-consuming requests from news media concerning the operation. In cases where extensive searches are being conducted release of information to the public may bring important leads to the SMC.
- 1.185.** News releases should be written following the time-proved format of who, what, where, when, why and how. In drafting a release all six of these items should be covered in paragraph one. Subsequent paragraphs can provide additional detailed information concerning one or more of these questions. By drafting releases in this fashion the news media will be able to chop portions of the release in order to meet their space requirements without damaging the overall story. The release of names can be a sensitive issue and organisational policies and procedures should be established in accordance with privacy guidelines.
- 1.186.** A good news release will be well written, factual and newsworthy. It should not contain personal opinion, judgements, elaboration, colouring or any classified material. Asking the following questions may test news-worthiness:
- a. Is story still timely?
 - b. Are the people involved known?
 - c. Is the story unusual?

- d. Is locality within the range of the news media's interest?
 - e. Does the story have general interest?
 - f. Has the story a personal or human-interest appeal to many people?
- 1.187.** SAR officers shall not disclose to the media:
- a. the names of any crew or other missing persons;
 - b. any personal judgments pertaining to any persons involved in the incident;
 - c. any comments on the judgment, experience or training of persons involved in the incident;
 - d. degrading opinions on the conduct of the SAR operation or personalities involved;
 - e. personal opinions and theories;
 - f. names of those associated with the search;
 - g. names of persons who have given information relating to the incident.
- 1.188.** SAR Officers comment on behalf of other SAR Authorities or organisations.
- 1.189.** Media releases may include the following information:
- a. reason for the SAR operation, eg. Missing person, report of impending crash landing; weather situation; beacon activation
 - b. number of missing persons
 - c. area being searched
 - d. number and types of assets engaged in the search;
 - e. arrangements for the search;
 - f. details of other authorities participating in the search; and/or
 - g. reinforce the positive aspects relating to safety and survival.
- 1.190.** As the operation progresses, releases should be made periodically to keep the public updated on the progress that is being made. A final release should be made when the case is concluded. This release should summarise the activities conducted during the operation, giving full particulars on the efforts expended to locate and rescue the distressed persons. The final release should be a complete summary of the incident and detail:
- a. Number of search teams, SES, Number of personnel being used.
 - b. the number of aircraft missions, total hours flown and use of vessels;
 - c. auxiliary land or coastal search, if applicable;
 - d. the reasons for termination;
 - e. any other information relevant to the incident that should be made public.
- 1.191. Requesting Public Assistance:** The SMC may enlist the news media to access information from the general public. In sparsely populated areas, information from the general public may be sought through the media, requesting members of the public to contact the Crimestoppers or the local District Headquarters. A telephone number should be included as part of the release.
- 1.192. Liaison with Relatives:** Information that may significantly affect the conduct of a search may be obtained from relatives and friends of missing persons. Information relating to the personal history and possible courses of action taken by the missing persons should be collected by officers trained in investigation methods and competent to describe the current and proposed search plan in a reassuring manner.
- 1.193. Notification of Next Of Kin:** The SMC should be aware of the concerns of the relatives of the missing persons. During a search, it is recommended that one staff member should maintain regular contact with the relatives to provide information and outline plans. If appropriate, relatives should be encouraged to visit the RCC to enable them to see the search effort. Next of kin/relatives should be advised at an early stage of any SAR operation, to ensure where possible that the timing of associated media releases) does not cause them undue concern.
- 1.194.** Where available, police liaison officers should be utilised to give initial advice to relatives and particularly when providing advice that a death or deaths have occurred. It is

- preferable that this information can be passed personally rather than by telephone, so as to ensure that appropriate support services are provided.
- 1.195.** In any event, before a search is suspended or terminated SAR management should ensure that the next of kin are consulted as far as possible. They should be fully briefed on the complete search effort, conditions in the search area, and the reasons for proposing the termination of the search. Relatives are more able to accept the SMC's decision to suspend or conclude search operations if they are privy to the processes.
- 1.196.** Whenever foreign nationals are the subjects of a search and rescue action, the Department of Foreign Affairs and Trade should be informed.
- 1.197.** The ADF is the sole authority for releasing any information to next of kin of ADF members.
- 1.198. Casualties:** State Police will be responsible for the releasing the names of civilian casualties. The names of military casualties of a SAR Incident are only to be released by the ADF or the appropriate national authority for visiting military units.
- 1.199.** The names and addresses of survivors shall not be released until a positive check and identification has been accomplished. Generally, survivor information should not be released prior to the release of casualty information, although circumstances may dictate some departure from this procedure. Survivors shall be encouraged to contact their own families as soon as possible and all reasonable assistance towards accomplishing this shall be provided. Controlling the dissemination of information by survivors is difficult and requires tactful briefing. Whenever possible the PRO should brief survivors on what information may be released. Information on survivors who are ADF members or members of foreign military units is only to be released by the ADF or the appropriate national military authority.

Chapter Two - Communications

- 2.01. Search Communications and Radio Employment:** The communications system is the means by which control is maintained and therefore any system should be:
- efficient;
 - reliable; and
 - self-sustaining.
- 2.02. Communications:** Sound communications, involving not only the use of telephones and radio, but as many alternative systems as possible, must be pre-planned and implemented. Basic requirements are:
- between Search Headquarters, Field Search Headquarters and Support Base;
 - between Search Headquarters and Assembly Area (if set up);
 - between Field Search Headquarters, Search Teams and Sub- Headquarters if necessary; and
 - between Field Search Headquarters and Support Base.
- 2.03. Communications Officer:** It is the task of the Communications Officer to ensure that as far as practicable, the SMC's actions and decisions are never restricted through lack of communications.
- 2.04.** Although Communications Officers need not be technicians, they must understand the broad characteristics, capabilities and limitations of the various means of communications that may be employed. Good communications do not just happen—they must be planned.
- 2.05. Communications Requirements:** The possible variations in requirements are almost unlimited but can be broadly classified as:
- headquarters;
 - rear net; and
 - forward net.
- 2.06. Headquarters Requirements:** The Search Headquarters may be the nearest Police Station or building which already has telephone facilities and good access. If this is not available, consideration must be given to the following aspects in choosing the site for Search Headquarters:
- A house or building with telephone, light and power already connected.
 - site satisfactory for radio, which is elevated and clear of possible sources of electrical or other interference. The Communications Officer would normally choose this site provided it was compatible with the other operational factors mentioned.
 - Good access for both vehicles and people to provide for possible use of messengers.
- 2.07. Telephone/Radio:** If a telephone is available, maximum use should be made of this facility, but a back up radio system may be necessary. If distances are short, field telephones are an efficient alternative. Messengers could be used if no other method was available.
- 2.08. Rear Net:** This may involve communications from Search Headquarters to:
- Field Search Headquarters;
 - Support Base;
 - Assembly Area (if established);
 - statutory authorities;
 - government instrumentalities; and
 - voluntary organisations.
- 2.09.** Communications here would most likely be by telephone. If the search appeared to be escalating into a lengthy operation, consideration could be given to the provision of direct telephone lines by liaising with the service provider. However, cost is likely to be incurred therefore expenditure approval should be obtained before installation.

- 2.10. Forward Net:** This can be defined as the communications required from Field Search Headquarters to the searchers in the field and these requirements can vary considerably. The most likely configuration would be from Field Search Headquarters to:
- Support Base
 - search teams; and
 - sub-headquarters if employed.
- 2.11.** The principle here is to use whatever communication systems are available, but generally the forward net would depend on radio. Satisfactory communications can be quickly established provided the Communications Officer is aware of the SMC's operational requirements relating to quantity, range, and the terrain over which they will be required to operate. If the operators understand the basic characteristics and limitations of the sets in use, and normal radio net discipline is maintained, reliable communications will be achieved.
- 2.12.** A sample of the search communications net diagram is shown as Annex O to this Chapter.
- 2.13.** There are certain terminologies used when discussing radios, and the SMC should be aware of these and what they mean. All radio transmitters emit electromagnetic waves on a particular frequency and it is this frequency of operation along with the power output of the set which governs its operational characteristics.
- 2.14. Frequencies:** The most common methods of radio communications are listed below:
- HF (High Frequency)**—HF operates in the band 3 to 30 MHz. In addition to ground waves, sky wave operation is possible which vastly increases the range. This type of transmission relies on 'bouncing' radio waves from a layer of ionised gases 150 km above the earth's surface and back down to ground. Considerable distances can be achieved using HF. However, the system tends to be noisy and requires large aerial installations and some degree of expertise to operate. It would normally be used only as a rear link back to a search headquarters;
 - VHF (Very High Frequency)**—VHF operates in the band 30–300 MHz. This type of transmission is commonly used by mobile radio fleets and gives reliable communications over a distance of 20–30 km. It is primarily 'line of sight' transmissions. This means that hills or major obstacles may impede reliable communications and the base site should always be as high as possible. Some difficulty may be experienced at times by searchers losing communications. If this happens, operators should be aware that a small change in location or moving to a high point may assist in regaining contact. This applies equally to UHF; and
 - UHF (Ultra High Frequency)**—UHF operates in the band 300– 3000 MHz. This method is strictly 'line of sight' and in flat or open terrain, to increase its range, it requires repeater stations on some high point to relay messages and therefore requires some degree of technical expertise to install.
- 2.15. Radios in General:** Modern two-way radios are generally of a robust construction but must be treated with care. They should not be dropped, immersed in water or left out in the rain, and ancillary items such as microphones and aerials should be handled carefully.
- 2.16.** Attention must be given to the state of the batteries in portable sets and spare batteries should always be available. Batteries should not be left in sets which will not be used for any length of time. It is recognised that most radio failures are caused by a lack of care and knowledge on the part of operators, rather than deficiencies within the sets themselves.
- 2.17.** During search operations it is likely that situations will arise where radio communications are less than 100% effective. Teams should be briefed as to their actions in case of a loss of communications. These actions may include backtracking to their last point of communication, problem solving, using other forms of communication, relaying through other stations, non use of Distress Devices – 'no news is good news', or carrying on with an assigned task – 'be at this spot at this time'.

- 2.18. Ground to Air Communications:** Aircraft operate on aviation transport group frequencies allocated by Australian Communications Authority and can be contacted through the airport control tower, but radios are available which can contact aircraft on a special frequency. Prior arrangement with the aircraft pilot is necessary to work on this channel as the aircraft normally listens out on tower frequencies.
- 2.19.** Another alternative is to place on board the aircraft a portable radio on the same frequency as is being used by the search teams.
- 2.20. Procedures and Practices:** To achieve efficiency, standard radio procedure should be used. Although two-way conversations will be needed, messages should be written. It may also be necessary to refer to past actions or decisions and this makes necessary the keeping of a written record. Search Team Leaders should carry a note book to record messages.
- 2.21. Other methods of Communications:** Other methods of communicating, which can be used but require some degree of planning are:
- a. **Control of Contact or Close Search**—Whistles, loud hailer, simple voice orders. (To contact both single and multiple teams).
 - b. **Location of Search Teams or Finds**—Smoke, light (fire), signalling mirrors.
 - c. **Recall signals**—Whistles, sirens, gun shots, pyrotechnic rockets.
 - d. **The General Public**—Commercial radio stations for supplying information and instructions to the public.
 - e. **Mobile Communications**—For relay points.
 - f. **Field Signals**—Searchers may be required to use field hand signals or audible sounds to communicate within or between teams. Recognised audible signals are:
 1. one short blast at irregular intervals—searchers looking for a missing person and as an acknowledgment of a distress signal;
 2. three short blasts together, regularly spaced—distress signal; and
 3. four short blasts together, regularly spaced—which is recall signal.
- 2.22.** Short blasts are regarded as sounds audible for one second. Where organisations use audible signals for other purposes, three blasts must be avoided.
- 2.23. Summary:** The success of a search will largely depend on good planning and adequate control in the field. This is based on the SMC having a free hand to deal with field operations, at the same time receiving maximum support from the Search Commander.
- 2.24.** Under no circumstances should unofficial searchers be allowed in the search area, and any person disobeying instructions should be withdrawn immediately.

Chapter Three – Awareness and Initial Action.

- 3.01. Awareness and Notification:** When the SAR system first becomes aware of an actual or potential emergency, the information collected and the initial action taken are often critical to successful SAR operations. It must be assumed that in each incident there are survivors who will need assistance and whose chances of survival are reduced by the passage of time. The success of a SAR operation depends on the speed with which the operation is planned and carried out. Information must be gathered and evaluated to determine the nature of the distress, the appropriate emergency phase, and what action should be taken. Prompt receipt of all available information by the SMC is necessary for thorough evaluation, immediate decision on the best course of action and a timely activation of SAR assets to make it possible to:
- a. locate, support and rescue persons in distress in the shortest possible time; and
 - b. use any contribution survivors may still be able to make towards their own rescue while they are still capable of doing so.
- 3.02.** Experience has shown that the chances for survival of injured persons decrease by as much as 80% during the first 24 hours, and those for uninjured persons diminish rapidly after the first three days. Following an accident, even uninjured persons who are apparently able-bodied and capable of rational thought are often unable to accomplish simple tasks and are known to have hindered, delayed or even prevented their own rescue.
- 3.03. General Considerations for the SMC:** SMC duties can be demanding. The gathering of information, evaluation of this information and initiation of action all require concentrated effort on many details. The SMC will find the various forms, checklists, worksheets, tables and graphs provided in the appendices to be very helpful. The following paragraphs provide some general guidance for the early stages of a SAR operation, including information gathering and preparation for the possible need to plan searches.
- 3.04.** Several factors will influence the extent and manner of an initial SAR response. In general these are the:
- a. extent and reliability of information about the location of the missing persons
 - b. availability of aircraft, and land parties for searching;
 - c. actual and forecast weather conditions;
 - d. times of daylight/darkness;
 - e. nature of terrain;
 - f. availability of survival supplies and supply dropping teams.
 - g. Time delay in notification.
- 3.05. SAR Stages:** The response to a SAR incident usually proceeds through a sequence of five stages. These stages are groups of activities typically performed by the SAR system in responding to a SAR incident from the time the system becomes aware of the incident until its response to the incident is concluded. The response to a particular SAR incident may not require the performance of every stage. For some incidents, the activities of one stage may overlap the activities of another stage such that the portions of two or more stages are being performed simultaneously.
- 3.06.** In the previous LSOM the stages of SAR were defined as Alert, Standby, Callout, Action and Stand-Down. This National Land Search and Rescue Manual will use the National SAR Manual 5 stage approach as shown below.

3.07. Land SAR Stages explained:

- a. **Awareness:** This is the stage when it is believed a search is pending and requires an increased level of preparedness. This may include knowledge by any person or agency in the SAR system that an emergency situation exists or may exist.
- b. **Initial Action:** The stage when preliminary action is taken to alert SAR assets and obtain more information. The stage may include evaluation and classification of the information, alerting of SAR assets, communication checks and, in urgent situations, immediate performance of appropriate activities from other stages.
- c. **Planning:** This is the stage where the executive command to mount an operation whereby all personnel and resources requested are required to deploy. The development of operational plans including plans for search, rescue and final delivery of survivors to medical facilities or other places of safety as appropriate are done during this stage.
- d. **Operations:** This is the stage during which the search and/or rescue operation is conducted, including dispatching SAR assets to the scene, conducting searches, rescuing survivors, providing necessary emergency care for survivors and delivering casualties to medical facilities.
- e. **Conclusion:** The stage when the SMC declares that the search is concluded, personnel are recalled, debriefed and released. All documentation required for the SAR is completed.

3.08. Land SAR Incident: A land SAR incident is considered imminent or actual when:

- a. a request for assistance is received;
- b. a vehicle or person is reported overdue;
- c. it is apparent that a vehicle or person is in distress;
- d. a PLB has been activated; and/or
- e. a MEDEVAC is required.

3.09. Emergency Phases: Emergency phases are based on the level of concern for the safety of persons/vehicles. Upon initial notification the notified SAR authority classifies the SAR incident as being in one of the three emergency phases:

- a. Uncertainty Phase (INCERFA);
- b. Alert Phase (ALERFA); or
- c. Distress Phase (DETRESFA).

3.10. The emergency phase may be reclassified by the SMC as the situation develops. The current emergency phase should be used in all communications about the SAR incident as a means of informing all interested parties of the current level of concern for the safety of persons which may be in need of assistance.

3.11. Uncertainty Phase: The uncertainty phase is assigned any time doubt exists as to the safety of a person because of knowledge of possible difficulties, or because of lack of information concerning progress or position. The keyword is DOUBT.

3.12. An Uncertainty Phase is said to exist when there is knowledge of a situation that may need to be monitored, or to have more information gathered, but that does not require dispatching of resources. When there is doubt about the safety of persons, the situation should be investigated and information gathered.

3.13. For missing persons, an Uncertainty Phase is declared where the persons have:

- a. been reported overdue at the intended destination;
- b. failed to make an expected position safety report; or
- c. there has been no immediate request for assistance received but the possibility exists that a situation could escalate.

- 3.14. Alert Phase:** The alert phase is assigned any time apprehension exists for the safety of a person because of definite information that serious difficulty exists which does not amount to a distress or because of a continued lack of information concerning progress or position. The key word is APPREHENSION.
- 3.15.** An Alert Phase exists when persons are having some difficulty and may need assistance, but are not in immediate danger. Apprehension is usually associated with the Alert Phase, but there is no known threat requiring immediate action. SRU's may be dispatched or other SAR assets diverted to provide assistance if it is believed that conditions might worsen or that SAR assets might not be available or able to provide assistance if conditions did worsen at a later time. For overdue persons, the Alert Phase is considered when there is a continued lack of information concerning the progress or position of the persons. SAR resources should begin or continue communications searches, and the dispatch of SRU's to investigate high-probability locations or overfly the persons intended route should be considered. Aircraft passing through areas where the concerned persons might be located should be asked to maintain a sharp lookout, report all sightings and render assistance if needed. An Alert Phase is declared when:
- a. following the Uncertainty Phase, subsequent attempts to establish communication with the missing persons have failed or inquiries to other relevant sources have failed to reveal any news;
- 3.16. Distress Phase:** The distress phase is assigned whenever immediate assistance is required by a person threatened by grave or imminent danger or because of continued lack of information concerning progress or position. The key words are GRAVE OR IMMINENT DANGER and IMMEDIATE ASSISTANCE.
- 3.17.** The Distress Phase exists when there is reasonable certainty that persons are in imminent danger and require immediate assistance. For overdue persons, a distress exists when communications searches and other forms of investigation have not succeeded in locating the persons. If there is sufficient concern for the safety of the persons to justify search operations, the incident should be classified as being in the Distress Phase.
- 3.18. Organisation:** In conducting a search, it is important that it be properly organised and well controlled. Time spent in assessing the situation (pre-search information) and organising the search will never be wasted. In fact, a search should not be launched before all the information has been assessed.
- 3.19. Responsibility:** All organisations which may be involved in a land search operation must recognise that the overall authority and control rests with the police.
- 3.20.** The senior Police officer (Search Commander), whilst retaining control over the whole operation, may delegate authority for field search operations to another person; however this would depend on local circumstances. If a SMC is appointed, it must be clearly understood by everyone that the appointee is responsible for the conduct of the search and will henceforth be known as the SMC.
- 3.21.** Each organisation involved in the search retains its own command function after being tasked by the SMC.
- 3.22.** When a SAR authority becomes aware of a possible SAR incident the SAR system is activated. The information is assessed and coordination is assumed or passed to the appropriate SAR authority for coordination.
- 3.23.** Members of the public are encouraged to report any abnormal occurrence they have witnessed or heard about. Notification of an event may reach the SMC from any source including a member of the public, telephone, radio or police information.
- 3.24.** For almost all emergency situations, action can be started as soon as the nature and general position of the emergency is known. Additional information, which might be helpful to the

resolution of the incident, should be obtained after the initial action has been taken. Communications should be maintained with the person reporting an emergency situation and they should be kept advised of the action being taken.

- 3.25. Evaluation of Reports:** All reports relating to a SAR operation must be carefully evaluated to determine their validity, the urgency for action and the extent of the response.
- 3.26.** While evaluation of reports might be difficult and time-consuming, decisions must be made and action taken as quickly as possible. If confirmation of uncertain information cannot be obtained without undue delay, the SMC should act on a doubtful message rather than wait for verification.
- 3.27.** The evaluation of reports on overdue or missing persons should take account of:
- a. Communication delays: In some areas of Australia, communication delays may prevent timely reporting. This should be kept in mind when evaluating the significance of a report in order to prevent unnecessary activation of the SAR system while ensuring that the SAR response is appropriate should the circumstance be real;
 - b. Weather conditions: Adverse weather may contribute to communication delays or deviations from planned routes; and
 - c. Habits of the individual: Some individuals, including hikers, are known to react or may have been briefed to react in a certain manner in certain circumstances. Knowledge of these habits/company procedures may provide guidance in the evaluation of an incident and the subsequent planning and execution of search operations.
- 3.28. SAR Incident Information:** The following information, or as much as possible, should be obtained from the individual reporting the actual or potential emergency situation or incident. As many of the items should be obtained as circumstances permit.
- 3.29. Information Gathering:** Success or failure of any operation will depend on the availability of information. This information needs to be:
- a. accurate;
 - b. current; and
 - c. relevant.
- 3.30.** In many search operations, the time factor is critical, so there is a need to commence the search as soon as the situation allows.
- 3.31.** All search operations present special problems in that there will be an essential conflict between the urgency imposed by the situation, and the initial delay caused by the need to gather and evaluate as much information as possible.
- 3.32.** An understanding of the information gathering process must be a primary qualification for the Search Commander and SMC.
- 3.33. The Information Stages:** The information process is divided into four stages:
- a. **Collection**—Information related to the search should be collected in the shortest possible time and often comes from unlikely sources. Information required may relate to the:
 - (1) missing person(s);
 - (2) missing object(s);
 - (3) environment;
 - (4) terrain/topography; and
 - (5) weather.
 - b. **Collation**—Once the information has been obtained, it needs to be sorted into categories which relate to the problem. Where possible, this information should be displayed so it is readily available to the search command/control elements. In this

way, the task of evaluating the information is made easier and will make decision-making simpler.

- c. **Evaluation**—Within this mass of information, there will be sections that are irrelevant, unreliable or dated. It becomes necessary to evaluate all information and discard all that is inappropriate, and make decisions accordingly.
- d. **Dissemination**—The command/control elements need to pass on specific information to searchers in the field, to relay information to relevant authorities, and to pass information to the family of the person and to the media. This information needs to be current, accurate and relevant so that confidence is maintained.

3.34. Information gathering aspects: There are three main aspects of information-gathering:

- a. type of information required;
- b. availability of and access to information; and
- c. evaluation of information acquired.

3.35. Type of Information:

1. Missing person. As much information as possible regarding the person(s) needs to be obtained. This should include but not be limited to:

- a. personal details (Name, DOB, address, telephone numbers, employment, social status, married, family troubles, happiness);
- b. physical features (Description, fitness, ability, past history);
- c. state of health (physical and mental);
- d. medication (taken, carried or left behind) (what are the effects of this?);
- e. dress (Wearing now and what taken? Is it suitable for the conditions?);
- f. Food/water (Any? Sufficient? Will last how long?);
- g. Handedness, (Left or right);
- h. any means of transport (Where is it? Public transport?);
- i. time last seen (Intentions, intended routes, previous routes?); and
- j. any other information considered relevant.

Such information may well dictate the urgency of the search. If, for example, the person has a history of going missing, it may suggest a policy of wait and see. Sample forms which may assist in obtaining relevant information are included as Annexes E, F and G to this Manual.

2. Objects: When conducting a search for an object such as aircraft, boat, vehicle, or any other article, it will be necessary to gain a complete description of the object. This should include:

- a. description;
- b. make;
- c. model;
- d. colour;
- e. size;
- f. weight;
- g. registration number;
- h. markings; and
- i. safety aspects/danger.

Where an object is unlikely to be readily identifiable, the requirement for detail is increased. If possible, a model, photograph, or drawing should be obtained. Particular emphasis should be on safety factors if the object is likely to offer a hazard to the finder. An example would be the hazards associated with modern aircraft. A sample Object Questionnaire is included as Annex G to this Manual.

3. Weather: It is of vital importance to gain knowledge of weather conditions that have or are likely to prevail in the area of search prior to, during and in the immediate

future. In extremes, this will indicate the possible time frame for the missing person's survival.

4. **Area of Search:** The success of an operation will depend to a large extent upon accurate prior knowledge of the area/locality to be covered. It will be necessary to have knowledge of:

- a. general topography;
- b. known problem areas;
- c. terrain;
- d. foliage/ground cover; and
- e. check/rendezvous points.

It is desirable therefore, that a field reconnaissance be carried out as early as possible.

5. **Resources.** The resources for the search operation will be those made immediately available by the responding organisations and may be supplemented by those obtained by the Commander. These resources are basically in two groups:

- a. *Personnel.* Information should include:
 - i. number available;
 - ii. experienced/inexperienced;
 - iii. capability and response considerations
 - iv. time available; and
 - v. special requirements (eg. mountain rescue).
- b. *Equipment.* This may include:
 - i. vehicles;
 - ii. aircraft;
 - iii. radios;
 - iv. maps; and
 - v. special equipment.

With regard to resources, the appropriate allocation may determine the success of the operation, whilst it should be recognised that the quality of resources, both personnel and equipment, may decrease with time.

- 3.36. **Availability and access of information:** Having detailed the type of information required, there are three factors to consider:

- a. Where may the information be obtained?
- b. How may the information be accessed? (eg. medical records).
- c. How much is enough?

- 3.37. **Sources of Information:**

1. **About Missing Persons:** Sources of quality information may include:

- a. family;
- b. friends;
- c. school;
- d. employer;
- e. family doctor;
- f. last known contact;
- g. hospitals/medical centres; and
- h. public transport companies.

2. **About Objects:** Information sources may include the:

- a. owner;
- b. operator;
- c. manufacturer; and
- d. industry.

3. **About the Weather:** Sources may include:

- a. Bureau of Meteorology;
 - b. local knowledge;
 - c. local records; and
 - d. experience.
4. **About the Area:** Sources may include:
- a. maps (topographic, parish, forestry);
 - b. sketches;
 - c. local knowledge;
 - d. aerial photographs; and
 - e. reconnaissance.
4. **About Resources:** Sources may include:
- a. police;
 - b. emergency services;
 - c. bushwalking club;
 - d. Defence services;
 - e. general aviation;
 - f. community facilities/organisations; and
 - g. media.
- 3.38. **Evaluating Information:** The Search Commander/Field Search Controller must consider the traits and personality of the missing person, together with the merit of all available information, to predict the person's possible movement, or to reduce the area of probability.
- 3.39. Because total required information will not be available prior to commencing a search, information-gathering and evaluation will be continuous throughout an operation.
- 3.40. On evaluating the information the search commander will need to make some judgment of the urgency or severity of the situation. He will need to decide whether to take any action or not. A useful aid in coming to this decision is the Search Urgency Form, located at Appendix E.
- 3.41. **Search Information Phases:** The phases for gathering search information include the following:
- a. **Pre-Search Phase** (Collection, collation, evaluation)—In the period between raising the alarm and the actual beginning of the search, as much relevant information as possible needs to be acquired and evaluated. The assessment of information is described in Chapter 5 and this may determine that an alarm has been raised prematurely and the search should be delayed or cancelled, or it may reinforce the sense of urgency due to factors such as:
 - (1) missing person's physical or mental condition;
 - (2) weather conditions; or
 - (3) terrain in the area.
 - b. **Briefing Phase** (Dissemination)—The decision to mount a search has been made and search teams are being prepared to commence the operation. Team Leaders are required to attend a briefing at which orders will be given regarding the conduct of the search. Details that need to be covered are:
 - (1) information relevant to the missing person;
 - (2) the area to be searched;
 - (3) the recommended search pattern;
 - (4) the command and communications system; and
 - (5) any special instructions (the method for producing orders and conducting briefings is described in Chapter 6).

All this information must be clearly and fully understood by the participants. The omission of a single item of information may lead to an unsuccessful search conclusion.

- c. **Search Operations Phase**—In the conduct of the operation, the search teams must constantly seek and provide further relevant information. This may be provided in the form of:

- (1) location of physical clues;
- (2) information from persons in the area;
- (3) interpretation of topographical factors; and
- (4) general experience.

All such information needs to be evaluated and passed to the Field Search Headquarters. Field information acquired by this means may dictate the future course of the search. A sample Team Situation Report is shown as Annex B to this Chapter.

- d. **Debriefing Phase** (Collection, collation, evaluation, dissemination)—As search teams return to the Field Search Headquarters, Team Leaders/ teams need to be debriefed. Care needs to be taken that all relevant information is gathered and then re-evaluated as the situation develops.

This information will then be distributed to teams still in the field or before new teams are deployed.

- 3.42. Extended searches:** When a search extends over a long period, the briefing, search operations and debriefing phases will operate as a cycle. As search teams return and have been debriefed, the information obtained will be evaluated and become part of the briefing of the next teams to be deployed. This cycle will continue until the end of the search.
- 3.43. Notification to States of Foreign Persons in Distress:** If a foreign national is subject to a Distress Phase, that is found not to be a false alarm or is involved in an accident or a foreign national is killed or injured in a SAR related incident, the relevant foreign State is to be notified through the Department of Foreign Affairs and Trade (DFAT). SMC advice should be directed to the DFAT Communications Duty Officer or the Desk Officer for the State concerned.
- 3.44. Recording of Events:** The SMC shall maintain records for each incident in which all information should be recorded as it is received, either in full or by reference to other permanent records such as forms, maps, etc. Details of all phases notified to the SMC and all information relating to action initiated by the SMC shall be recorded in chronological order.
- 3.45.** Where information is contained in other records, (messages, forms etc.), these shall be held in such a way that reference to them may be easily made throughout the operation. All hard copy information shall be retained for filing.
- 3.46.** Each day's search activity shall be plotted. The total search area shall be subdivided into sections assigned to each SAR unit showing individual search patterns and other relevant details. A plot shall be kept of areas searched as well as those not searched.
- 3.47.** Records may be kept of the actual hours of operation of search craft, showing individual transit times and times engaged in search and/or rescue activity. These records may be used for assessment of financial claims received from operators.
- 3.48.** Records shall be kept of names of all volunteers used in SAR operations on assets tasked by the SMC usually in the form of a manifest.
- 3.49.** When a search has been terminated without locating a missing person all records, maps etc shall be retained and be accessible to SAR staff to allow easy resumption of search activity should further intelligence be received.
- 3.50.** Records relating to search and rescue operations, including air searches, on behalf of other organisations shall be retained.

- 3.51. Records should be retained for coroner's court/civil proceedings and for the possible access of other authorities.
- 3.52. **Urgency of Response:** Evaluating incidents to determine the urgency and the extent of required SAR response, or the termination of response is a function requiring information, judgement and experience. In emergency situations requiring immediate assistance, the action taken must be accomplished quickly and positively. Where uncertainty exists, evaluation is usually more difficult and time consuming because of the many factors involved.
- 3.53. Perhaps the most difficult task the SMC undertakes is the evaluation of these factors. They usually become apparent between the time the incident is reported and the execution of the search. This is a time when speed and reliability will be most important, however it is also a time when incident reports may be incomplete or confused.
- 3.54. The most serious SAR limitation is time. When persons are injured or are subjected to adverse climatic conditions, the chances of survival decrease rapidly. Time limitation also may be dictated by the number of hours left for a daylight search, although the SMC should not arbitrarily rule out night search, especially in unpopulated areas and over flat terrain or deserts.
- 3.55. The facilities available to conduct a search may be limited by lack of available personnel and search assets. The SMC must be aware of availability of SAR facilities within their region.
- 3.56. Terrain and weather conditions can affect all areas in SAR planning and operations. Search visibility, aircraft limitations, search effectiveness, safety of flight and time available to complete the search are some of the factors that will affect search capability.
- 3.57. Whenever practicable, pertinent data should be plotted on a map to aid in evaluating related factors.
- 3.58. Normally the SMC determines the urgency and extent of SAR services required for an incident. A rapid but systematic approach is essential since prompt response to emergency incidents is the essence of the SAR system.
- 3.59. **General Time Factors:** The probability of finding survivors and their chances of survival diminish with each minute after an incident occurs. Prompt positive action is required so that no life will be lost or jeopardized through wasted or misdirected effort. Individual incidents will vary with local conditions such as terrain, climatic conditions, ability and endurance of survivors, emergency equipment available and SAR units available to the SAR system.
- 3.60. In the case of seriously injured survivors or survivors in a hostile environment, the reaction time of the SAR system must be measured in minutes. Critically injured survivors of any accident usually die within the first 24 hours if not given emergency medical care.
- 3.61. **Daylight Factor:** For survivors not equipped with any type of detection aids daylight visual search is usually the only search method available to the SMC. If darkness were approaching this would be another limiting factor for the SMC to consider.
- 3.62. **Night Factor:** If it is known or suspected that the survivors have detection aids such as pyrotechnic flares or other night signalling devices or can display other lights, night searches should always be conducted. Night searches, visual and electronic are particularly effective over sparsely populated areas, flat terrain and deserts.
- 3.63. Night aural and visual search should be considered. Modern electronic detection methods may be effective in locating targets. The capability of these devices should be discussed with the operators of the equipment.
- 3.64. **Weather Factors:** It is of vital importance to gain knowledge of weather conditions that have or are likely to prevail in the area of search prior to, during and in the immediate future. In extremes, this will indicate the possible time frame for the missing person's survival.

Adverse weather prevailing in or approaching an area where survivors are located may also limit the time available to conduct a SAR operation. Not only are survivors of an incident more difficult to detect under adverse weather conditions, but also SAR units themselves operate at lower efficiency due to conditions and higher stresses on the search personnel.

- 3.65. Accurate knowledge of weather conditions and the prudent judgment based on it will enhance the likelihood of a successful mission. Knowledge of the prevailing weather conditions will also play an important role in the safety of the search units.
- 3.66. If weather will not allow for a search operation to be mounted without endangering additional lives, the search effort should be deferred. If weather is currently good but forecast to deteriorate in a short time, more rapid action is required and detailed planning may suffer due to the time available. If weather is good and forecast to remain so, more extensive planning may be accomplished.
- 3.67. Wind, visibility and cloud cover influences both the search spacing of ground personnel and sweep width of any aircraft used. Therefore, the better the weather information, the more realistic will be the derived sweep widths. Maintaining accurate search patterns is difficult in adverse weather. Aerial units are particularly vulnerable. For this reason the patterns selected should allow for more precise navigational accuracy.
- 3.68. Safety may sometimes be prejudiced by actual weather conditions, which must, therefore, be monitored continuously by the SMC. Low cloud base and restricted visibility are particularly hazardous during searches that cover large areas where many aircraft are employed. Should air search be conducted under adverse weather conditions that deteriorate below the required flight conditions, then air search may have to be suspended.
- 3.69. **Weather Reports by Survivors:** Occasionally missions will occur during which radio or mobile telephone contact can be established with survivors who do not know their exact position. If survivors can report sufficient weather information, the SMC and meteorological personnel may be able to develop an approximation of the survivor's position by fitting the survivor's weather into the current synoptic picture.
- 3.70. The following weather information should be requested immediately, and on a scheduled basis thereafter, if possible:
 - a. percentage of cloud cover;
 - b. estimated height of clouds;
 - c. type of description of cloud;
 - d. estimated surface wind velocity;
 - e. winds aloft direction, if discernible by cloud movement;
 - f. prevailing weather phenomena such as snow, rain, fog, sea state, etc.;
 - g. the times of sudden changes in wind or weather such as rapid clearing, quick deterioration, sudden changes in wind direction, noticeable change in temperature, blowing dust or any other condition that might indicate frontal passage;
 - h. outside air temperature;
 - i. pressure reading of barometer or altitude reading of altimeter set for 1013 HPA;
 - j. pressure trends from altimeter or barometer; and
 - k. observed times of sunset and/or sunrise.
- 3.71. **Urban Environment:** Land searches in urban areas are often required. The general strategy employed for urban search is similar to that of the rural or 'bush' search, but the problems encountered are different. Urban search problems include:
 - a. greater number of places of concealment;
 - b. complicated search areas;
 - c. greater number of property owners; and

- d. distinguishing between the missing person and the local population. It is vital to have a good description and preferably, a current photograph of the missing person or object.
- 3.72. Urban Search Strategies:** Urban search and rescue should not be confused with USAR which is the locating and rescuing of persons trapped inside fallen buildings such as in an earthquake. This task normally falls to the respective Fire and Rescue Authorities. Urban land searches will usually progress through the stages of:
- a. reconnaissance;
 - b. general search; and
 - c. building/contact search.
- Though the stages are similar to that of a rural search, variations to some of the methods and techniques are required.
- 3.73. Urban Search - Major Complex:** In the case of a major complex, eg a large hospital, each of these stages would be included within the boundaries of the complex. If the lost person is not found, then a new search area surrounding the complex is determined.
- 3.74. Urban Search Area Segmentation:** The same segmentation principles apply as for rural search operations. Boundaries will generally be defined by artificial features, such as roads, drainage channels, railway lines and major complexes (industry, commerce, government). Some natural features which may form boundaries include rivers, shorelines and nature strips. Where roads are used as boundaries between search segments, the boundary would normally follow the centre line of the road.
- 3.75. Urban Environment - Reconnaissance Search:** The reconnaissance stage requires small search teams to carry out a quick check of specific areas of high probability within the area of possibility. Areas which should be checked during the reconnaissance stage:
- a. Locations that are familiar to the lost person, eg current or previous residence, the home of friends and family, church, hotel, even if assurances are given that these areas have been checked.
 - b. Hazardous areas eg construction sites, quarries, rooms/buildings that are rarely used (locked or unlocked).
- 3.76. Urban Environment -General Search:** A general search stage is carried out in an area of probability, checking for signs or indications of the missing person. A check of such places as public buildings eg public toilets, railway station and other shelters, such as store and plant rooms or a large building, large culverts and beneath bridges, should be carried out. A special check of hazardous areas, including railway tracks, banks of rivers, lakes, swimming pools, drains, dams and construction sites where the missing person could be trapped or injured, should be made.
- 3.77. Urban Environment - Building/Contact Search:** Building search as it implies, requires the systematic searching of each and every corridor, room and possible place of concealment within a building. Several buildings may be contained within one property, therefore requiring a systematic search of the property surrounding the buildings. Always gain permission to search property or seek police assistance. Building searches in large complexes, such as a hospital or shopping centre, present a different problem. Divide these buildings into sectors by wings or, in the case of a multi-story building, by floors. Appoint a separate team leader for each of these sectors and, where possible, have a member of the staff who occupy the building (with knowledge of the building) accompany the team leader.
- 3.78.** The team leader must progressively report those areas searched and list those areas not searched, ensure that they are searched, later.
- 3.79. Urban Environment, Conclusion:** Don't be misled by thoughts or statements such as 'there wouldn't be anyone in there', or information like 'I've already searched that building'. If you have the responsibility to search an area, then you make sure that you or those for whom you are responsible cover the whole area.

- 3.80. Forensic Search:** The Police may request assistance with searching for forensic evidence. A high level of skill and motivation is required as searchers may be required to spend long, sometimes tedious, hours scanning small areas for any evidence such as:
- a. human teeth
 - b. spent bullet casings
 - c. hair
 - d. jewellery
 - e. shoes
 - f. footprints
 - g. weapons.
- The method employed will usually be a reconnaissance style search:
- a. Members stand shoulder to shoulder
 - b. The ground is intensively scanned in front of each footfall
 - c. The search progresses foot step by foot step, or on hands and knees
 - d. All the principles for preserving clues are applied
 - e. Some times material is brought to the searchers to sift through
- 3.81. Caves and Mines:** Enthusiasts are now delving deeper and further underground into increasingly more difficult areas of caves or abandoned mines. Caves and older mines pose many problems to both the caver and potential rescuers, including narrow constrictions, vertical shafts, water at varying levels, risk of collapse and rock falls, bad air and almost complete darkness. Search and rescue in these environments should only be undertaken by trained specialists. There are several spelunking groups in the southern states and most of the underground mines have mine rescue specialists that could be called upon in an emergency.
- 3.82. Available Search Asset Factors:** During the prosecution of any SAR mission the SMC will have assets at their disposal whose primary mission is not SAR but who have SAR capabilities.
- 3.83.** It is of primary importance that the SMC fully understands the limitations of all facilities available in their region if they are to be effectively used. The number, types, equipment and experience of available search units will limit the courses of action available to the SMC.
- 3.84.** In addition there may be instances when all available crews are either committed to other operations, in the case of flight crews or have expended their maximum authorised crew duty time.
- 3.85.** Some time is usually required for suitable search units to arrive on-scene, with this time delay being factored into any search planning.
- 3.86.** The search units' navigation capability will influence the areas to which it can be assigned, since accurate navigation in search areas is essential for effective coverage.
- 3.87. Survival Equipment Factors:** The amount and type of survival and signalling equipment available to the survivor will influence not only the urgency of the SAR system's response, but also the methods and procedures employed in various SAR stages.
- 3.88.** The SMC may concurrently conduct an aerial search and a ground search. The SMC must use their common sense, good judgment and background experience to evaluate the appropriate response for taking advantage of the survivor's capability to signal and survive.
- 3.89. Risks v Gain Factors:** SAR facilities are responsible for taking whatever action they can to save life at any time and place where their facilities are available and can be effectively used. Nevertheless, there may be a point beyond which SAR services are not expected and cannot

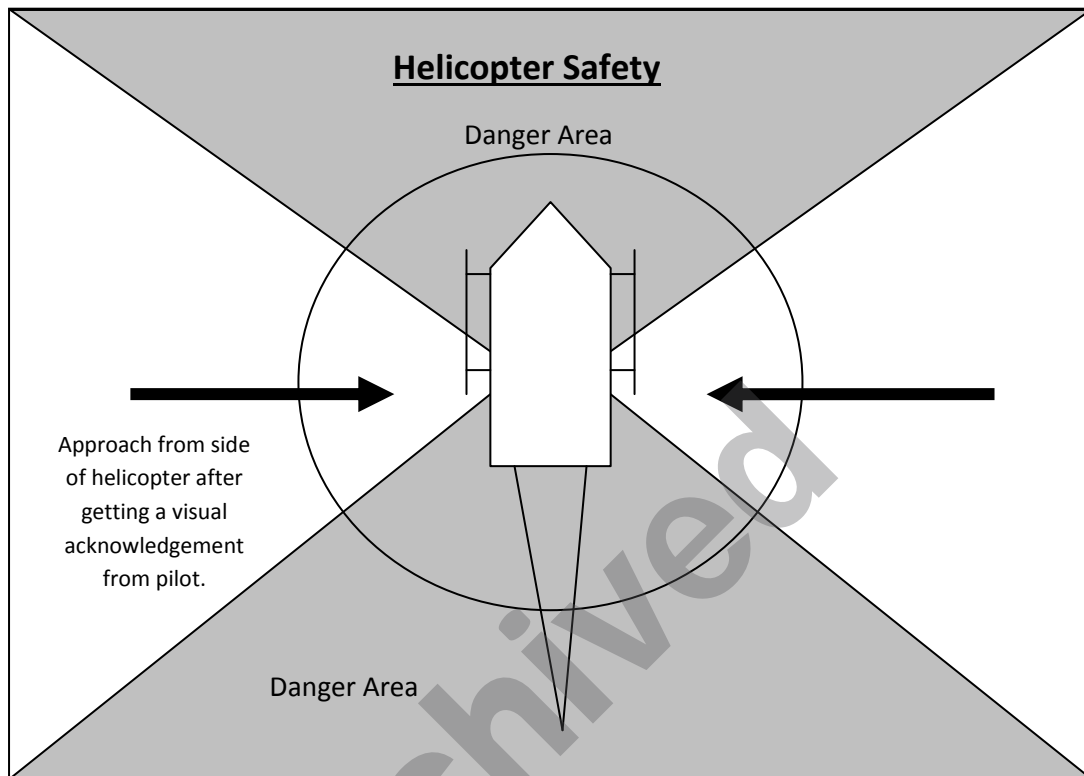
be justified. Known and inherent risk must be carefully weighed against the mission's chances for success and the gains to be realised.

- 3.90. SAR personnel and equipment shall not be placed at risk, nor the mission attempted, unless lives are known to be at stake and the chances for saving lives are within the capability of the personnel and equipment available.
- 3.91. All reasonable action shall be taken to locate distressed personnel, determine their status and bring about their rescue. Prolonged SAR operations after all probability of survival has been exhausted are uneconomical and not warranted. The decision to conduct such operations must be based on probability of detection.
- 3.92. Studies have shown that the period within 12 to 24 hours of a distress incident is the most critical for recovery of survivors. The best chance of successful recovery occurs during this time period. Within 48 hours, chances are still good, but after that time the chance of successful recovery decreases rapidly.
- 3.93. **Resources:** While there are a wide range of resources available throughout Australia to assist the SMC is conducting a SAR mission, not every resource will be available in every location for each search. A SMC should ensure that they keep an up to date register of available resources within their SAR area, including telephone numbers and alternatives, man power and equipment, capabilities, travel times and other information.
- 3.94. Resources must be assessed in terms of capability, availability and durability. Such resources are:
 - a. human; and
 - b. physical resources.
- 3.95. **Human Resources:** Human resources should be categorized as trained and untrained. Trained searchers must be proficient and effective in skills such as:
 - a. leadership;
 - b. working as team members; and
 - c. use of map and compass, bushcraft, communications, first-aid, skiing, etc. have an understanding of the organisational functions supporting the operation.
- 3.96. It is preferable to use trained teams who are experienced in working together. This however, is not always possible. If untrained searchers are to be used, they must be under the control of a trained and experienced leader. People with specialist skills should be utilized within their area of expertise. The tasks allocated to teams need to be within the capacity of those teams. This includes their area of search, terrain, conditions and functions.
- 3.97. **Human Trackers:** The art of tracking a person through bush is fast vanishing; however, it should not be overlooked as a means of finding a missing person. In parts of Australia, there are indigenous people who have maintained this art and there are others who have developed these skills.
- 3.98. If a suitable tracker is available, consideration should be given to their use as valuable time can be saved by going directly to the missing person rather than conducting a slow methodical search. This does not mean that if a tracker is available, there is no need for search teams.
- 3.99. Trackers are not infallible and tracking over rocky ground or through swamps may not be possible. Where the tracker has lost the trail or cannot proceed, the search team takes over until the trail is relocated. The tracker and the search team can and must work in harmony, but the team must ensure that they do not obliterate the trail which the tracker is following. Trackers use visual tracking techniques, the requirements for which are good eyesight, memory, practical intelligence, fitness and an understanding of nature.

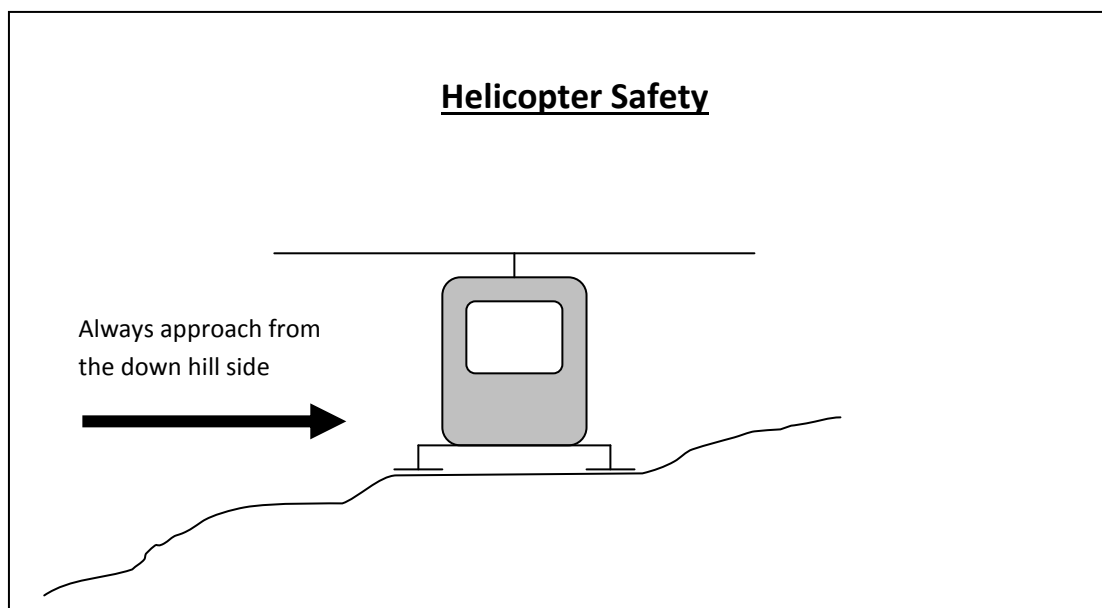
- 3.100. Physical resources:** Physical resources available to each area will be many and varied, each having a special function. Therefore, each should be employed accordingly. Such resources include:
- a. aircraft;
 - b. vehicles;
 - c. horses;
 - d. dogs; and
 - e. boats.
- 3.101. Aircraft:** There are aircraft available to suit specific circumstances. Provided weather prevailing in the area is suitable, aircraft can cover an area quickly and economically, thus relieving the problem initially of utilizing ground teams. Aircraft are particularly useful in the reconnaissance stage.
- 3.102. Fixed Wing Aircraft:**
- a. This should preferably be of high-wing monoplane construction, with a low stalling speed, economical fuel usage and an air dropping capability. This will allow good visibility from the aircraft and a viable time period over the search area.
 - b. Refuelling points should be as close to the search area as possible.
 - c. Observers should be trained and rotated regularly.
 - d. In protracted flying operations, consideration must be given to the limitations of flying hours for the pilot(s).
- 3.103. Rotary Wing Aircraft:** Rotary wing aircraft, due to their ability to hover and fly slowly are a very valuable land SAR asset. Helicopters are also the most common form of rescue platform. Most helicopters used in land SAR are equipped with a winch, nite Sun for illumination and FLIR. They also have telephones, a variety of radio communications, GPS and can normally land near the search area. Each state has SOP's regarding the use of helicopters in searches.
- 3.104. Helicopters, advantages:** Some of the advantages of using a helicopter are:
- a. Large open areas can be searched with relative speed.
 - b. Water areas can be searched in most weathers when a surface search may be dangerous.
 - c. The size of the area covered may reduce the necessity of other resources.
 - d. Good observation capability.
 - e. Can give the SMC an overall appreciation of the search area.
 - f. Routes can be identified.
 - g. Hazards to searchers can be identified.
 - h. Rooftops of buildings can be searched without risk.
 - i. Night search can be aided by the Nite Sun.
 - j. May enhance public perception of the search.
 - k. Assist in the coordination of ground resources.
 - l. Have the capacity to hover over and land in remote locations.
 - m. If the aircraft is fitted with a hoist (winch), placement or extrication of individuals may be accomplished without landing. In protracted flying operations, consideration must be given to the limitation of flying hours for the pilot(s).
- 3.105. Helicopter, Disadvantages:** Some of the disadvantages include:
- a. Effectiveness is governed by the weather.
 - b. Restricted visibility by forest canopy, buildings etc.
 - c. Restricted flight times
 - d. Requirement for fuel in the more remote areas.
 - e. FLIR unable to penetrate forest canopy.
- 3.106. Aircraft Safety:** All aircraft are potentially dangerous, so approach only on indication from the pilot that it is safe to do so. Be aware of rotors/propellers.

3.107. Because of their mode of operation, helicopters present specific safety problems:

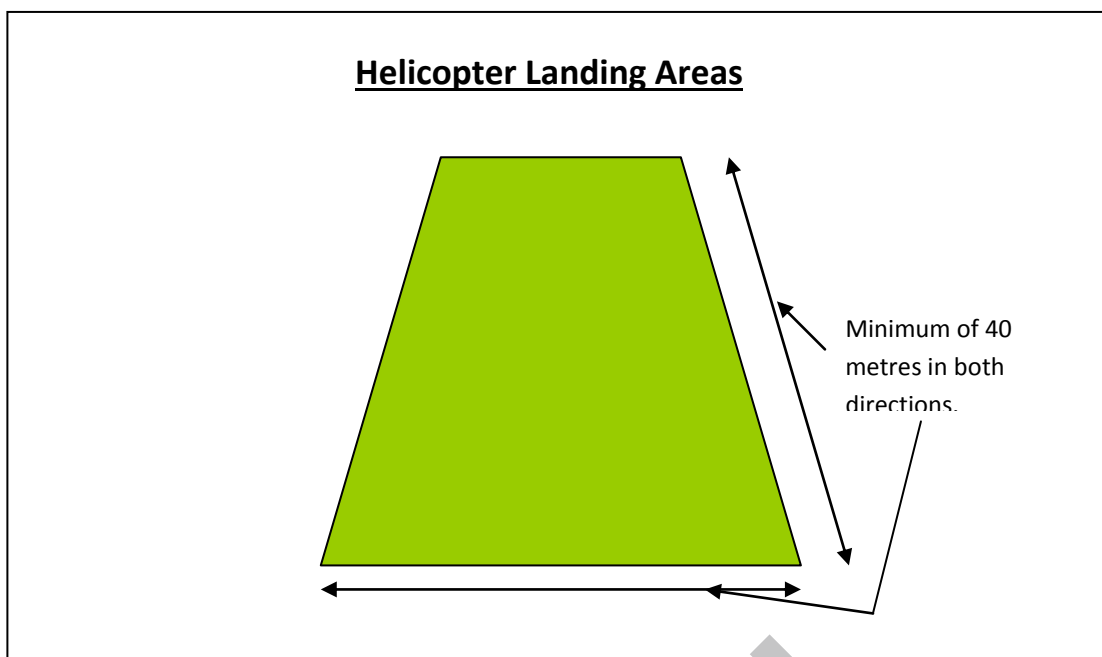
- a. Wherever possible, passengers are to be loaded or unloaded with the rotors stopped.
- b. When stopping the rotor is impractical, passengers shall approach or depart the aircraft within an arc of 60 degrees either side of the nose centre line remaining in full view of the pilot and only with the pilot's approval.



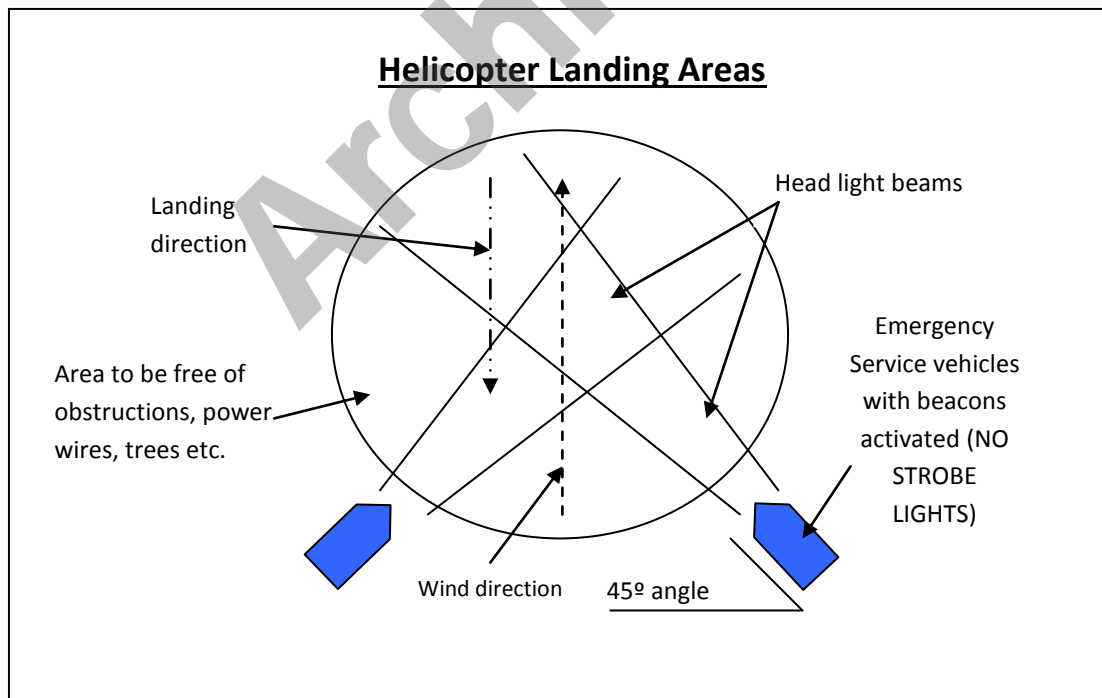
- c. To gain approval, position yourself in view of the pilot and clear of the rotor, indicate with a thumbs up signal held to the side of the body, and await a return thumbs up signal from the pilot.
- d. When approaching or departing the aircraft with rotors turning, be conscious of the rotors' downwash and secure articles such as caps, hats, or other light items so they will not be sucked up into the rotor system or blown away.
- e. Under no circumstances are persons to approach from or depart to the rear of the aircraft or pass behind it in the vicinity of the tail rotor.
- f. Where the helicopter has landed on sloping ground, the hazard of approaching or departing up or down the slope, into or away from the helicopter, must be fully understood.



- g. Keep long objects, poles, rods, radio antennas etc. parallel to the ground while beneath the rotor arc of the helicopter.
 - h. Observe the path of the rotor and keep well clear of it. In gusty conditions, the main rotor blades will flap closer to the ground as they slow down. If the helicopter is being shut down, be particularly careful until the rotor blades have completely stopped turning
- 3.108. Helicopter Loading:** To ensure minimum turn-round time and maximum use of the aircraft:
- a. ensure all stores or personnel are in position prior to the aircraft landing;
 - b. brief personnel on the relevant safety aspects and check individuals for hats, caps, other loose items;
 - c. if stores are bulky or heavy, have a work party on hand to load the stores. Brief these personnel on the relevant safety factors; and
 - d. employ a system of loading and unloading which ensures that what is needed first is loaded last.
- 3.109.** Only those directly involved in the helicopter operation should be in the immediate vicinity of the aircraft. All other persons should be kept away. It is good practice to ensure that the immediate area surrounding the helicopter is properly secured.
- 3.110.** The downdraft created by the aircraft rotor will propel dirt, small stones, grass, leaf particles and other items with great velocity and may cause severe or permanent eye damage. This is especially noticeable during landing and lift off.
- 3.111.** Persons operating around the immediate vicinity of the aircraft should be equipped with protective goggles. All other persons should turn away from the aircraft and cover their eyes with a hand or hat to minimise any possibility of eye injury. Ear protection should also be considered.
- 3.112. Helicopter Landing Zones:** The dimensions illustrated will accommodate all helicopters likely to be used in search and rescue operations. For small helicopters, a smaller area may be possible however; the pilot will determine the requirements.
- 3.113.** The area indicated as 10 metres square needs to be cleared to ground level. The area of approximately of 40 metres square should be cleared to a height of 0.5 metre, with a corresponding clearing out to whatever distance is deemed necessary by observation or instruction by the pilot.



- 3.114. Approaches need to be clear of all high tension wires, telephone wires, and preferably fence wires. The angle of approach and departure should have an elevation of approximately 15 degrees.
- 3.115. All grass cuttings, branches and logs should be removed well away from the immediate landing zone. When the aircraft is functioning in an operational environment, the maximum slope of ground deemed safe is a gradient of 1:8.



- 3.116. **Allocation of Aerial Search Areas:** Aircraft should be allocated specific areas of search, with regard to the type and operation method of the particular aircraft concerned. This will ensure the area is covered fully. The pattern of search should be in accordance with the tasking.

- 3.117.** Thick cover will restrict to some extent or, in some circumstances, prevent visibility entirely. However, overflights may still gain vital information and may attract the attention of the missing persons, and they may be able to move to an area of visibility and attract the attention of the aircraft observer.
- 3.118. All Terrain Vehicles:** A wide variety of all-terrain vehicles are available which may prove useful in
- a search operation. They could include:
 - a. motor cycles;
 - b. mountain bicycles;
 - c. four-wheel drive vehicles;
 - d. tracked vehicles;
 - e. oversnow mobiles; and
 - f. quad bikes.
- 3.119.** The use of vehicles in search operations follows the same principles as searches on foot in that:
- a. visual contact must be maintained between vehicles;
 - b. all ground between searching vehicles must be seen; and
 - c. the vehicle team is usually controlled from the centre.
- 3.120.** Considerations for the use of vehicles are:
- a. speed of search;
 - b. the added advantage of height which allows an observer to look down on the terrain;
 - c. the noise of vehicles may attract attention of the missing person but conversely may drown out calls for help. Stop the vehicle, turn off the motor and listen;
 - d. by placing an observer in the rear of a vehicle, a different perspective of the terrain can be searched;
 - e. vehicle searches are not as detailed and small items may be missed;
 - f. because the driver is concentrating on driving, each vehicle should have a number of observers each searching a given arc, which requires additional personnel;
 - g. vehicles require considerable logistic support; and
 - h. vehicles should be self-sufficient in terms of equipment appropriate for the conditions, rations and water, first-aid kit, repair kit, fuel, oil and spare parts.
- 3.121.** From these considerations, it is obvious that vehicle searches are useful for general searches in open country. They are not suitable for detailed searches or operations in close or heavily-vegetated terrain except for transport, reconnaissance and perimeter searches over open ground or formed tracks.
- 3.122. Motor Cycles:** An off-road cycle is a robust, flexible piece of machinery. This vehicle can traverse a wide variety of terrain. The rider must be fully self-sufficient in terms of clothing and equipment appropriate for the prevailing conditions, rations and water, first-aid kit, repair kit, fuel, oil and spare parts. Competent riders can travel at a walking pace or cover ground quickly depending on the situation.
- 3.123. Method of Operation:** Ideally, bikes should travel in pairs, with one rider equipped with a radio. However, depending on the terrain, multiple bikes are functional. Even with the motor at idle, there is no guarantee calling may be heard, especially if shouts are feeble, or at a distance. Motor cycles should travel at a slow speed. At regular intervals the rider should stop, turn off the engine, call out and listen.
- 3.124. Limitations:** The use of motor cycles in search operations imposes certain limitations which must be considered:
- a. The overall vision distance of the rider may be reduced when sitting on the machine.
 - b. Distraction from searching when concentrating on manoeuvring the motor cycle over difficult terrain.

- c. Inability to communicate by radio whilst mobile.
 - d. Difficulty with navigation whilst mobile.
- 3.125. Searching on Motor Bikes:** The search area should be contained within fence lines, or roads to act as boundaries. An initial reconnaissance of the perimeter may indicate if the ground is suitable to employ motor cycles, or whether the subject may still be within the bounded area. Once it has been determined to search a specific location, the motor cycles can then traverse the area in a systematic manner.
- 3.126. Dogs:** A well trained dog and handler can be an effective aid to the search, provided that they are used correctly. To obtain the maximum value from dogs, it is essential to have an understanding of the conditions best suited for their employment.
- 3.127.** Dogs, like other animals, are subject to outside influences which have a direct bearing on their behaviour. Therefore, the performance of any dog, no matter how highly trained is not constant and it cannot be expected to work effectively under every type of condition. This is often not fully appreciated and instances have occurred where the use of dogs has been refused, simply because the person responsible for the search was ignorant of the capabilities and limitations of this resource.
- 3.128.** The effectiveness of the dog is directly proportional to the capability of the handler. The most commonly available dog for search purposes in a general purpose dog, normally used by police services throughout the country. These dogs have the ability to detect persons and property where discarded or concealed.
- 3.129. Tracking Conditions:** They utilise two forms of scenting, the track and free search and are ideal for locating missing persons. The ability of a dog to track depends entirely upon its sense of smell. All matter gives off scent to some degree. It consists of minute particles which tend to fall to the ground at varying distances from the source. The combination of all these scents makes up a scent picture which the dog follows. Composite scents consist of natural and artificial scent. This picture varies with the individual, depending on race, diet and habits. Added body odour is the scent given off by the wearers clothes, hair oil and toothpaste, equipment, footwear and those released by the brushing and breaking of vegetation and the crushing of small insects. The ability of the dog to follow a track depends on the distribution, quantity and age of a scent. It is therefore critical to ensure, where possible, that the search area is not contaminated unnecessarily prior to the arrival of the dog team.
- 3.130.** The dogs are able to track persons over a variety of terrain and will also be able to locate items possibly discarded by the missing person. The LKP is the best place for a dog to commence searching. The scene should be left undisturbed to give the dog the greatest opportunity of finding the missing persons scent. If the exact LKP is not known the dog will search the area for the strongest scent and will follow this. In ideal situations a good dog will be able to track a person up to two hours after they have walked over a field or grassy area, and about ½ hour after they have crossed a concrete or hard surface. Strong wind, rain or heat will affect the dog's ability to track. It must be emphasised that the area should not be contaminated by other searchers for a dog to perform at its best. Dogs do tire quickly.
- 3.131.** Cadaver dogs can be useful when searching for a deceased person. They are trained to detect the scent of humans buried in the earth or even those thrown into shallow lakes or ponds.
- 3.132. Factors affecting a successful dog search:** The following will affect the success of a search:
- a. **Time**—This is of prime importance. A fresh scent is easier for a dog to track.
 - b. **Vegetation**—High undergrowth restricts the dissemination of scent.
 - c. **Time of Day**—Night and early morning is best as evaporation is less rapid.
 - d. **Personal Hygiene**—A person, because of circumstances or carelessness, who is unclean gives off a greater amount of body odour.

- e. **Food and Equipment**—Obviously strong smelling foodstuffs eaten by the missing person increases the scent picture, eg. curry powder or spicy food.
 - f. **Running**—A person running gives off more scent than a person walking.
 - g. **Start Point**—Most tracker dogs do not need a piece of clothing belonging to the missing person to enable them to find and follow a scent, but if available, this should be preserved.
 - h. **Weather**—A mild overcast day favours tracking as it limits evaporation of scent.
- 3.133. Factors affecting an unsuccessful dog search:** The following factors adversely limit the dog's effectiveness:
- a. **Temperature**—High (dry) temperature will quickly reduce the scent due to evaporation.
 - b. **Wind**—A strong wind rapidly disperses the scent.
 - c. **Ground Surface**—Dry, bare ground, adversely affects tracking.
 - d. **Manure**—Heavily manured land may disguise the scent.
 - e. **Water**—Substantial running water courses can be an obstacle for tracking dogs.
 - f. **Scene Contamination**—Searchers and vehicles will contaminate the area by leaving a fresh scent or lifting the scent with the tyres.
- 3.134. Horses:** Horses have long been a part of search and rescue, although they are being supplanted by mechanical vehicles. The largest advantage of horses are the height of the rider, at over 2.5 metres, they have a much better view than a ground searcher. The visual horizon of the rider is almost doubled, as is the capacity to look over or down into thick cover. There is the added advantage of almost completely eliminating noise factors. Horses can cover the ground at a faster rate than a team of foot searchers, which may be a consideration for a FAST or reconnaissance search. An advantage over driven or ridden machines is that a horse can guide itself leaving the rider free to actually search.
- 3.135.** The horses and riders employed should be fit and capable of handling the terrain and weather conditions. That way, the horse can make its own way along, and the rider can scan the area fully. This will not be the case with a skittish horse, where the rider will spend most of the time controlling the animal and not seeing much at all.
- 3.136.** The employment of mounted search teams has a great deal to offer in those areas where competent riders and suitable mounts are available and the terrain suits their employment. Horses require a large amount of water so this should be taken into account in the planning phase.
- 3.137.** Horse mounted searches are not suitable for searching in detail because the observer is high from the ground and mounting and dismounting to look under bushes, in holes and depressions slows progress.
- 3.138. Horses: Advantages:** Some advantages of using a horse are:
- a. Ability to cover large wide open areas quickly.
 - b. Can cope with long distances before needing to rest.
 - c. Height advantage can compliment an urban search.
 - d. Speed can be an asset.
 - e. Mounted searchers enhance the public perceptions of a search.
- 3.139. Horses, Disadvantages:** Some disadvantages of using horses are:
- a. Height restricts closer examination of clues without dismounting.
 - b. Normally minimal numbers available, unless in the more outback areas.
 - c. May destroy clues with hooves.
 - d. Leave excrement in search area.
 - e. Darkness may restrict their ability.
 - f. Yarding, feeding and watering
 - g. Horseshoes and associated tools and equipment.

- 3.140. Dams, billabongs and still water searching:** Searchers should pay particular attention to shore lines and banks of rivers and streams in an effort to locate clues (footprints etc.) and avoid contamination of the scene. It is not always necessary to search in the water for missing persons. If a MP has been missing for several days or more then a noticeable greasiness or stain will be visible on the surface of the water. This will be similar to an oil slick (with the rainbow effects) and is made up of adipoceros material (brown or grey waxy material) as the body decays underwater. Colder and deeper water retards decay but does not stop the flow of this substance. There may also be a distinct odour of decay in the vicinity of the water. This smell is released from the small bubbles that float to the surface as a body decomposes and produces gas underwater. It may be profitable to utilise a cadaver dog to search the perimeter of waterways, even if there is no detectable smell, as their noses are far keener than a human.
- 3.141.** Check for signs that cattle are drinking from the water hole. Cattle will not drink from water where a body or animal is decaying unless there is no alternative.
- 3.142. Flowing water:** Missing persons deceased in flowing water present a difficult challenge to determine their location. In tidal rivers and creeks a deceased may be as little as 30 metres from where they entered the water, to as much as 500 metres. This is due to the tides moving the body in and out as they flow. The effect of the tides is a little like leeway in a marine environment. The amount of movement is a percentage of the tide and is mostly applicable on the body when it is between the surface and the bottom. Once on the bottom a body will move back and forth within a short distance, often creating small eddies and hollows in the bed if it is soft enough. Bodies will often also become snagged in tree roots, fallen branches and rock outcrops.
- 3.143.** Where possible do not use grappling hooks or similar devices when searching for submerged bodies. Have searchers wade through the water if it is shallow enough, using hands and feet to search the bottom or using divers if the water is deeper. These methods will cause less damage to a deceased person and will not dislodge them if they are snagged on a submerged object.
- 3.144. Boats:** Where searches are conducted near waterways, such as large dams, lakes or rivers, it may be desirable to use small boats to search along banks and shorelines. In very shallow water or in swamp country, it may be more suitable to use canoes. Teams and equipment may often be transported to and from tasks by boat rather than by vehicle or on foot.
- 3.145. Divers:** Police divers can be utilised during a SAR mission to search and eliminate water areas within a search area. These could include rivers, streams, canals, locks, lakes, wharfs, culverts, reservoirs, sewers, storm drains, storage tanks, cesspools and other confined spaces where breathing apparatus should be worn. Only professional police divers should be used in a SAR situation. Divers are trained in underwater searching and use similar techniques to ground searching. The SMC will need to identify the area to be searched, while the Dive Supervisor will determine the actual search strategy. Divers can use equipment such as ROV, sonar and side /radial scanning.
- 3.146. Divers, Advantages:** Some advantages of using divers are:
- Advice is always available
 - Areas can be searched within current WH&S constraints.
 - Specialist experience gives reassurance as to thoroughness of the search.
 - Photographs can be taken of objects or people in situ underwater.
 - Searching can be done at night.
 - Confined spaces can be searched.
 - Relatively cost affective.
- 3.147. Divers, Disadvantages:** Some of the disadvantages of using divers are:
- Weather can restrict their ability to dive.
 - Police divers are limited to specific depths (Varies between states)

c. Time constraints, (The deeper the dive the less time available to search)

3.148. Volunteers: It is rare that a search, especially one involving a small child or elderly person, will not attract a number of volunteers that are not part of a recognised search organisation. Often family members will also volunteer to be part of a search team. If the event has received some media airtime the number of volunteers will increase. The problem faced by the SMC is how to deal with the sudden influx of volunteers. These persons pose difficulties for a number of reasons, the unknown quantity of their experiences and discipline, their clothing and suitability for the task, their fitness state and their reasons for wanting to search.

3.149. If a volunteer is not suitably clothed and equipped they must not be allowed to participate in the search, for their own sake. Those volunteers that are suitably equipped and appear fit enough for the task may be divided and placed into the SES search teams where they can be supervised. Volunteers are never to be placed in a team of their own. Rules vary from state to state, but it is generally required that all volunteers sign on with the SES prior to being deployed. The SMC needs to be cognisant of placing family members within search teams, as there is the possibility of the target person being located deceased. The traumatic affects of a family member being in such a team need to be considered, more so if there is a possibility that the missing person may have met with a fall or other disfiguring death. The SMC should consider appointing a liaison member to remain with the family during the search.

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Chapter Four - Search Planning and Assessment

- 4.01.** It is important for the SMC to make an assessment of the facts of the situation relating to the missing person, as soon as possible after receiving significant information. These assessments may prevent any of the following errors being made:
- A search operation too slowly implemented due to a poor appreciation of the missing person's life and death situation.
 - A search operation which is terminated prematurely because it is falsely assumed that the missing person could not have survived.
 - A search operation which is conducted in too small or large a search area because of a lack of knowledge related to the missing person's mobility.
- 4.02.** While there will be many similarities in individual searches, each search will present its own peculiar problems.
- 4.03.** Unless each search is considered in detail and likely problems identified, the result could be:
- loss of life;
 - an ineffective search;
 - an aggravation of the situation;
 - bad publicity;
 - a loss of community credibility for the searchers;
 - a loss of organisation or individual morale; and
 - any combination of the above.
- 4.04. Conducting an Appreciation:** Before any search is conducted, the situation must be examined to determine:
- what has/or may have happened;
 - what has/or needs to be done;
 - what problems might be present or occur as the search develops;
 - how these problems might be overcome; and
 - how the operation is going to be conducted.
- This process is called 'conducting an appreciation' and can range from 'a quick think' of a few seconds to a deliberate consideration taking hours of work.
- 4.05. Definition:** An appreciation is an examination of all factors present in any situation which, in turn, will suggest possible courses of action.
- 4.06. Sequence:** No matter what the situation, the sequence of conducting an appreciation for any search should always be the same. This will ensure no point is overlooked.
- 4.07. Phases:** The phases in conducting an appreciation are:
- determine the aim;
 - examine the relevant factors;
 - determine the courses open;
 - select the best course of action; and
 - formulate the plan.
- 4.08. Aim:** By correctly defining the aim, the problem will be identified and what is to be achieved will be stated. The aim must be:
- clear;
 - concise; and
 - achievable.
- The aim should be one short, concise sentence and should start with a positive action statement (eg. 'To locate the missing person').
- 4.09. Limitations:** Sometimes there may be problems that will place limitations on the aim. If the missing person is a child or has a medical problem requiring urgent attention, the search will

have to be an immediate continuous search until found or called off. In a case such as this, the aim will have to be modified to take account of the limitation, eg. 'To locate the missing person within a specified time'.

- 4.10. Written Statement:** The aim should be written down and constantly referred to as the appreciation is developed.
- 4.11. Factors:** Factors are pieces of information which can affect the plan and can dictate the urgency of response. Not all factors will be relevant and some will have a greater effect on the plan than others.
- 4.12. Examination:** Only a careful examination of each factor will decide which is relevant, and establish the importance of the relevant factors to the plan. In examining each factor, it will be possible to make deductions which may have a bearing on the search. To do this, ask the question 'so what?' of each factor and answer until a logical conclusion is reached.
- 4.13. Example:** To determine the timetable necessary to enable the Field Search Headquarters to be operational by 0600 hours.
- a. **Factor:** It takes 90 minutes to get the headquarters operational once on site.
So what?
Will have to be on site not later than 0430 hours.
 - b. **Factor:** It will take 45 minutes to travel to the headquarters site.
So what?
Will have to depart base area not later than 0345 hours.
 - c. **Factor:** It will take 15 minutes to load stores prior to departure from base.
So what?
Loading must commence not later than 0330 hours.
 - d. **Factor:** The Equipment Officer will require 30 minutes to prepare and check equipment prior to loading.
So what?
The Equipment Officer is to commence task not later than 0300 hours.
- 4.14.** Using this process to examine each factor, it is possible to determine the course of action necessary to achieve the aim.
- 4.15. Courses Open:** The courses open are all the possible solutions to the problem which have been found through an analysis of the factors. Whilst all of them might work, an analysis of each course will show their advantages and disadvantages.
- 4.16. Example:** In a search for a missing child from the point where the child was last seen:
- a. **Course One**—Using people already there as searchers:
Advantages:
 - (1) The child may be found quickly.
 - (2) May not need to organise other searchers.Disadvantages:
 - (1) The people on site are unlikely to have previous search experience which means they will be unable to start without basic instruction in search techniques.
 - (2) Instructing these people will take time.
 - (3) Because of inexperience, they may become lost or injured.
 - (4) They may also destroy clues of value to trained searchers.
 - b. **Course Two**—Await the arrival of trained searchers:
Advantages:
 - (1) They require no training before commencing the search.
 - (2) They are less likely to become lost or injured.
 - (3) The likelihood of finding clues of value is greater.Disadvantages:
 - (1) It will take time to organise the call-out.
 - (2) They will take time to travel to the site.

- 4.17. Plan:** From the examination of the courses open, it can be determined that while both courses have advantages and disadvantages, it may be more appropriate to await the arrival of trained searchers.
- 4.18.** From this selection, a plan to allow for the use of trained searchers can be formulated.
- 4.19. Planning Principles:** The principles which should be observed when formulating any plan are:
- keep it simple;
 - ensure it relates directly to the aim; and
 - ensure it is based on logical deductions.
- 4.20. Keep it simple:** The best plans are simple, easy to prepare and are usually flexible enough to adapt. Complicated plans are not only more difficult to prepare, but they may be difficult to change once activated.
- 4.21. Relate to the Aim:** If the plan does not relate to the aim, the aim will not be achieved and the operation may be a failure.
- 4.22. Logical deductions:** If the plan is based on logical deductions, the plan will generally work.
- 4.23.** It is essential that prior to taking any action and committing searchers to an operation, an appreciation is conducted identifying the most appropriate plan for the conduct of the operation.
- 4.24. Search Planning:** The wellbeing of survivors is critically dependent on their early location and support. It is vital that as soon as possible after becoming aware of an incident, the SMC quickly implements procedures for a rapid search of the most likely area of distress. In general, the initial SAR response requires ready application of simple procedures to quickly cover the most likely areas of distress. The search area described will be of rudimentary construction, eg. a circle, square or rectangle depending on the Lost Person Behaviour and other intelligence gathered on the MP. The area will be of sufficient size to cover all reasonable alternative tracks of the MP and will incorporate all areas highlighted by intelligence information. This strategy precedes the more complex calculations that will give rise to a more precise area which, failing the success of the reconnaissance search will form the basis for a formally planned and executed action at a later time. The stage one search may be undertaken in relatively short time and allow ready allocation and briefing of the few necessary resources.
- 4.25.** All of the basic land search theory concepts are described in this chapter. Practical examples are provided for each concept, showing how it may be applied to the search-planning problem. These examples require only basic mathematic skills and an understanding of the basic probability concepts encountered in everyday life. Although search planning may be perceived to be complex, each step is relatively simple.
- Note:** It is essential when planning commences for search operations that rescue planning is commenced as outlined in Chapter Six. This is to occur as a concurrent action. Rescue planning forms an integral part of the Search Planning.
- 4.26.** Search planning involves the following steps:
- evaluating** the situation, including the results of any previous searching;
 - identifying the **Last Known Position (LKP)**, Point Last Scene (PLS) of the MP and any error associated with that location;
 - estimating the MP' post LKP/PLS **movements** and any associated error of that estimate;
 - using these results to **estimate the most probable location** or route of the MP and the uncertainty about that location;
 - determining the best way to use the available search assets so the chances of finding the MP are maximized (**optimal search effort allocation**);
 - defining **search sub-areas and search patterns** for assignment to specific search assets; and

- g. providing a **search plan** that includes a current description of the situation, search object description(s), specific search responsibilities to search assets, on-scene coordination instructions and search asset reporting requirements.
- 4.27.** These steps are repeated until either the MP/s' are located or an evaluation of the situation shows that further searching would be futile.
- 4.28. Scenario-based Assessment:** Scenario-based searching assesses the reasons for the loss of an object or the disappearance of a person and can be used alone or in conjunction with an appreciation. Consideration is given to all factors that may assist or impede the discovery of the missing person or object. A search strategy is developed from this in the eight stage process as described below. This method presents a better alternative to speculative searching as it is based on a full evaluation of all information available. It also allows for the consideration of multiple scenarios and ensures that the most appropriate assets available are used. If more than one scenario emerges, action must be prioritised according to the relevant merits of each scenario and the resources available.
- 4.29.** The eight stage process, **SCENARIO**, is a mnemonic designed to ensure that all of the objectives are achieved when searching for any type of object.
- S** Specify person or item sought
 - C** Confirm last location
 - E** Establish circumstances of disappearance
 - N** Note factors influencing discovery
 - A** Analyse possible strategies
 - R** Raise search strategies
 - I** Identify priority search
 - O** Ongoing reassessment
- 4.30** **Specify item sought:** Ensure a full and detailed description of the person or item sought, including clothing. This will enable recognition of any discarded items of clothing or parts.
- 4.31.** **Confirm last location:** The Last Known Position (LKP) should be used as the point to begin the initial search. The LKP can be either the location when the target was seen by a credible witness or the location identified from clues or evidence. If the target is responsive and self helping the LKP may change as clues and evidence are located. This may also identify a direction of travel.
- 4.32.** **Establish circumstances of disappearance:** This is the examination of the disappearance to determine why and how it occurred. All facts should be considered.
- 4.33.** **Note factors influencing discovery:** It is important to keep the search area contained and free of extraneous distractions such as other members of the public. Family of the target may also have a detrimental effect of the search. Other factors that may hamper discovery are the terrain, weather, resources and the need to preserve clues if the search is running parallel with a criminal inquiry.
- 4.34.** **Analyse possible strategies:** What are the likely scenarios from the above information? What happened for the person to become missing?
- 4.35.** **Raise search strategies:** A search strategy should be planned for the most likely scenario, based on resources available, search areas, containment and possible routes. If one scenario stands out a search should be instigated immediately. Searches of areas and routes must be achievable by the allocated resources within the allotted time.

- 4.36. Identify priority search:** The above information will identify the priority search area. This area may change as further information comes to hand. As resources become available further scenarios can be searched. Where resources are limited, the area of highest priority should be given preference. The decision making process behind this needs to be recorded in the running log.
- 4.37. Ongoing reassessment:** The whole process must be continually reassessed to ensure the appropriate use of available resources within the high priority scenario. It is also prudent to seek the opinions of another SAR trained personnel in the form of a consensus.
- 4.38.** It is appropriate for the SMC to use as many SAR planning techniques as possible to cover all possible situations and eventualities.
- 4.39.** Searching is the most expensive, risky and complex aspect of the SAR system. Often it is also the only way survivors may be located and assisted. All information received about the incident must be carefully analysed and evaluated before a search is undertaken and at frequent intervals during its progress. In the early stages of a SAR incident, it is almost certain that the SMC will need to make some assumptions about the nature, time or place of the incident. It is very important that such assumptions be kept separate from the known facts. It is important to distinguish conclusions based on known facts from those based partially on assumptions and to record these in the SAR running log. It is also important to re-evaluate all assumptions regularly and as new information becomes available. Any assumption, which is allowed to go unquestioned for too long a period, begins to falsely assume the appearance of fact, and can compromise the search effort.
- 4.40.** Some of the clues that may indicate the MP's location or situation include:
- a. their intentions;
 - b. last known position;
 - c. terrain and hazards;
 - d. health, experience and physical capabilities;
 - e. lost person behaviour;
 - f. environmental conditions; and
 - g. results of previous searching.
- 4.41. Search Urgency:** A Search Urgency Form will be completed as soon as possible to establish the seriousness of the incident to determine the appropriate response. An example of this form is contained in Appendix E
There are nine categories to be assessed:
- a. Number of MP's in group,
 - b. Age
 - c. Medical conditions
 - d. Physical condition
 - e. Clothing
 - f. Equipment
 - g. Experience
 - h. Weather
 - i. Terrain and hazards
- 4.42.** Each of the nine categories are individually assessed in line with information received. Each category is then assigned a number depending upon the situation. (eg. Section 1 relates to the number of missing persons. If there is only one then a number 1 is assigned to that section; If there are two MP's then a 2 is assigned etc.) After the completion of the assessment the assigned numbers are added to determine the overall seriousness of the incident. The appropriate responses are:

- 9-17 Immediate response
- 18-27 Measured response
- 28-33 Conduct further inquiries and reevaluate the situation

Also, if there is a number 1 assigned to any of the categories then an immediate response is required.

- 4.43. Terrain Factors:** Terrain may be a major factor in evaluating an incident. Terrain may dictate the type of search pattern required, and may limit the selection of search assets that can be used.
- 4.44.** Terrain may also limit the time available for search. For example low-level searches in mountain areas are normally limited to daylight only. Equipment, such as the type of hoist device used by available helicopters will also be influencing factors. Dense foliage may hamper both visual and electronic searches and require increased numbers of aircraft and closer search track spacing.
- 4.45.** Man-made additions to the terrain such as power-lines, towers and bridges must also be considered when planning search areas and the altitudes of search aircraft.
- 4.46.** The type of rescue team used after the distress site has been located is also dependent upon terrain. When there is doubt about survivors or the area is inaccessible, time is a factor. Should other help not be readily available, search teams may need to be winched into the search area. Before deploying assets under these conditions, the ability for them to land, to be re-supplied and recovered must be considered.
- 4.47. Rainforest environment:** All rainforests have a crown cover of 80 per cent or more and so are classified as closed forest. Rainforest comprise a significant proportion of Australia's closed forest, but only 2.6 per cent of the total area of native forests.
- 4.48.** Rainforest ground-covers are often sparse due to the low levels of light under the dense canopies. Understoreys are varied depending on the kind of rainforest. Some are characterised by vines or ferns. Mosses and other epiphytes are often a feature of rainforests. Vine forests are a kind of rainforest characterised by the presence of significant vines growing on the trees. They are largely confined to the tropics and sub-tropics. Rainforest with a significant cover of ferns and mosses are concentrated in the temperate zones and at high altitudes in the tropics.
- 4.49.** There are many types of rainforest, varying mainly with rainfall and latitude. Tropical and sub-tropical rainforests occur in northern and eastern Australia in the wetter, coastal areas as far south as New South Wales. Dry rainforests are a variation of tropical/sub-tropical rainforest that occur in pockets protected from frequent fire in sub-coastal and inland areas across northern and eastern Australia. Monsoon rainforests occur in northern and north-western Australia in the seasonally dry coastal and sub-coastal regions. Temperate rainforests occur in eastern and south-eastern Australia; warm temperate rainforests in New South Wales and Victoria, and cool temperate rainforests in Victoria and Tasmania, with a few outliers in the high altitudes of New South Wales and Queensland.



Distribution of rainforest in Australia

4.50. Rainforest Considerations: The following considerations should be taken into account:

- a. Time frame for Survival (*see medical considerations for SAR chapter 4*). In the rain forest environment it is critical that action is taken to consider time frame for survival. Forests have widely varied weather conditions from tropical to temperate this will impact of the survival time. The temperature variation within rain forests is much less than that of open plains. Because of the canopy and its shielding ability rain forests are slower to heat up during the day and slower to cool down during the nights. This results in a narrower difference between night and day temperatures. Although they are rain forests, and grow primarily due to a higher incidence of rain, there is often a scarcity of surface water, except in those areas with running streams or rivers. The ground is usually moist which has an effect of increasing the humidity of the atmosphere within the forests. This moist ground will also contribute to accelerated core body temperature loss for someone lying on the ground for any length of time. Wind can funnel through these forests, as a result of differences in temperature and air pressure from uneven heating of the canopy by the sun. These winds, coupled with a high humidity, will contribute to greater wind chill than would normally be expected.
- b. Forests will have dense canopy covers which are often multi layered. Dense canopy cover will cause problems with communications (SATPHONE) and navigation equipment (GPS). Secondary communication systems and navigation techniques will need to be employed. Standard navigation techniques, such as identifying a distant object to align a search team on a particular bearing or counting of steps to determine distance, often fail due to the restricted visibility and hidden obstacles on the ground. A search team leader will find it much harder to maintain a search line with more than a small team. In these conditions it is better to have several smaller teams under the overall control of a senior search controller. Compasses will be an essential item, although even the most 'bush savvy' person can easily become disorientated.
- c. Forest density will restrict visibility on the ground (long distance). In the denser areas of the rain forest visibility may be reduced to as little as 2-3 metres. Rain, mist and fog can also restrict visibility for searchers. Sparse ground cover is characteristic of rain forests, although this is often offset by a layer of leaf litter. Depending on the forest and the frequency of natural events this leaf litter will vary in depth, up to as much as 50cm. The leaf litter will hide or disguise potential hazards, such as rocky

outcrops and gullies. This will impede search efforts as well as increasing the degree of difficulty for ground teams. Toilet paper or other similar 'forest friendly' marking material will be a necessity to mark the boundaries of search areas as it will be extremely difficult to locate them using standard methods of grid references or GPS points.

- d. Canopy cover will also limit the effectiveness for aerial search – aircraft using Forward Looking Infrared will be unable to penetrate dense canopies with sensors. Thick canopy cover results in little natural light reaching the forest floor. Outside overcast conditions will mean that visibility will be considerably reduced at ground level. A combination of poor light and mist/fog will considerably reduce the probability of detection of a lost person. It may be necessary for search teams to carry portable lights with them and may also limit the amount of search time available to the search coordinator.
- e. While rain forests are spectacular places to visit and sight see then can also have a detrimental psychological effect upon those who are lost in them. The continuous low light levels, lack of direction, apparent never ending forest and dampness will contribute to depression and feelings of despair among lost persons. These same conditions can also affect searchers, but often to a lesser extent. Rain forest conditions can also cause our human primeval fear of the dark, which can result in a lost person moving aimlessly around in the forest seeking an escape. There are very few large animals which will actively harm humans, the exception being the cassowary of northern Queensland, with rain forests, but there are many smaller animals that can cause an unreasonable level of fear in some humans. These include leeches, ticks, spiders and the many nocturnal forest creatures.
- f. Good maps of rain forest areas are not common. The standard practice of aerial cartography does not work well when the ground can not be seen.
- g. Due to moist conditions it is often very difficult to light a fire, for either warmth or cooking. Artificial means are almost always required, such as small gas cylinders or hexamine. Unless the lost person is well trained in survival it is best to consider that there are no edible fruits or animals within the forest. A large number of plant species are toxic as are the crayfish and eels of rain forest streams if eaten raw.

4.51. Rainforest Behavioural characteristics: Be aware that lost person in rainforest conditions may exhibit any or all of the following:

- a. Failure to make shelter
- b. May be hidden in the buttress roots of many rain forest fig varieties.
- c. Discard their equipment
- d. Disorientated – walking any direction
- e. Tend to walk down hill (depending on level of experience – experienced walkers may try to access high areas to resolve their position)
- f. Following a path of least resistance
- g. Cold Temperate areas – may exhibit characteristics of Alpine areas

4.52. Rainforest Resources considerations:

- a. Experienced Search Teams – with local knowledge and the ability to navigate within a featureless environment.
- b. National Park Rangers – or local rangers
- c. Police Mounted Units, Search and Rescue Mounted Units
- d. Aviation support – consider limitations.
- e. Tracker dogs, may be valuable first up but will otherwise be easily distracted by the many rain forest smells.

- f. Motorcycles - search and rescue trained
- 4.53. Alpine environment:** Alpine areas relate to high mountainous areas which are subject to extreme environment changes involving rain, snow, hail and strong winds.
- 4.54.** Alpine search teams differ from *normal* ground search teams mainly due to the different weather, altitude and hazards they must face and the different variety equipment and skills they use to overcome and travel in these hazardous conditions.
- 4.55.** Due to these hazardous conditions an Alpine searcher should be a trained SAR member skilled in movement over snow & alpine survival skills able to move efficiently, skillfully and with safety in winter or sub winter conditions through terrain at low or high altitudes. This member must be of a high fitness level, able to cope with the physical and mental demands required to move efficiently in this changing environment. All alpine SAR members must be able to work as a team member and be prepared and equipped for overnight survival when necessary.
- 4.56.** These guidelines are intended to differentiate Alpine searchers from *normal* searchers to allow for the selection of teams to handle situations that are specific to their expertise and training.
- 4.57. Alpine Considerations:** The following considerations should be taken into account:
 - a. Equipment – Alpine equipment is very specialized to deal with extreme temperatures and conditions. All equipment should be suitable for the conditions and be checked by a team leader before entering an alpine environment. Poor equipment can put searchers lives in danger.
 - b. Alpine searchers – Due to extreme conditions and change environment only trained alpine searchers should be used in the field on an alpine search. When entering remote areas a team should be no less than four members who are self sufficient for overnight.
 - c. Time frame for Survival (*see medical considerations for SAR chapter?*) In Alpine environment it is critical that immediate actions be taken to reduce the likely risk of exposure to hypothermia of the missing person/s.
 - d. Medical training - Due to difficult access and remoteness of an alpine search, Paramedics or equivalent medical expertise in search teams or readily available to render assistance.
 - e. Search techniques and search patterns – A search manager should utilize local knowledge of Alpine SAR members and/or ski patrol to assist in search tactics due to alpine mobility issues of search teams and lost persons.
 - f. Restrictions in mobility of search teams and lost persons. Allow for greater time periods in the travel of distances.
 - g. Makeup, search technique and search patterns used by searchers.
 - h. Avalanche risks – A search manager should use only trained avalanche specialist in declaring search areas safe and when leading search teams in specialized searching using probes and avalanche receivers.
- 4.58. Alpine Behavioural characteristics:** Hypothermia is the lowering of a body's core temperature. (see medical section) and is the most common condition missing persons will suffer from in an alpine environment. A search manager and team leaders should be aware that lost person in alpine conditions may exhibit any or all of the following:
 - a. Failure to make shelter

- b. Discard their equipment
- c. Disrobing of clothing
- d. Failure to respond to searchers
- e. Following a path of least resistance

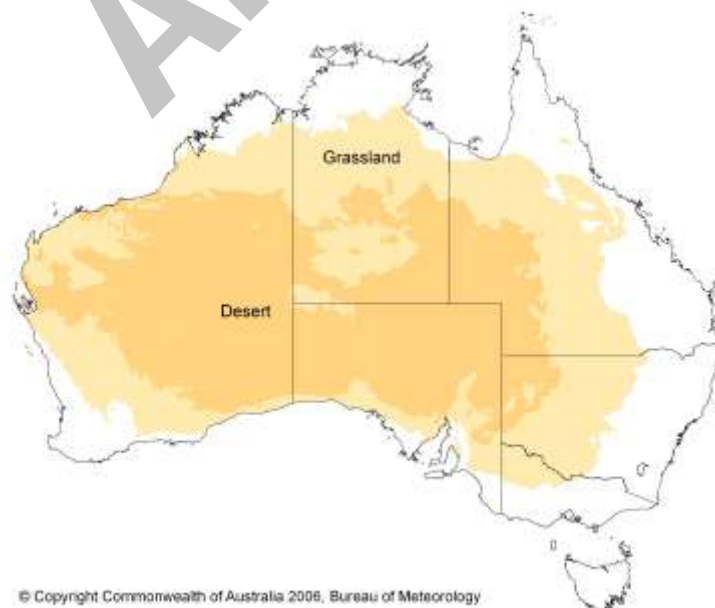
This should be considered when clothing or equipment is located by search teams.

4.59. The majority of missing persons in alpine environments wear high visibility clothing and equipment. Due to changing weather conditions they become disorientated, misjudge distances and become benighted.

4.60. Alpine Resources considerations:

- a. Overland snow/all terrain vehicles
- b. Ski patrols
- c. Alpine horse riders and bush walkers from volunteer rescue agencies
- d. Aviation support
- e. Thermal imaging / night vision
- f. Avalanche specialists
- g. Mountain trained members in mountaineering, steep, snow and ice techniques
- h. GPS – carried by search teams
- i. Medical staff on standby.

4.61. Arid Environment: Australia is the world's driest inhabited continent. Over 70% of the continent receives between 100mm and 350mm of rainfall per year, classifying it as semi-arid or arid. Desert regions are found mostly in central and western Australia, which makes up approximately 18% of the mainland. All of Australia's deserts are classed as subtropical deserts, given their location between the latitudes of 20 degrees and 30 degrees south of the Equator. They are hot deserts, which means they have little rainfall and extreme temperatures, often reaching over 50°C. Humidity averages at between 10 and 20 percent. Searing day time temperatures, cold nights and lack of water are just a few of the challenges facing travelers in the desert.



Distribution of Deserts

- 4.62. Desert surfaces are not always sandy; some consist of stones or 'gibbers' and have no sand at all. Sandy deserts in Australia are The Simpson Desert, The Great Sandy Desert and the Great Victoria Desert. Stony deserts include The Gibson Desert, and the Sturt Stony Desert.
- 4.63. **Arid Environment Considerations:** In desert conditions, because of the extremes of temperature, both hyperthermia and hypothermia can affect the missing person. The amount of water carried and the methods which it is used by the missing person can have a critical effect on survival times. During the initial action stage an assessment of the target needs to be made in relation to their possible actions while the search is being conducted. Persons who are level headed and remain in a sheltered or shady location will survive for much longer periods than a person who is attempting to self help by walking throughout the day. The general rule is for a target to remain with their vehicle if lost as it is far easier to find a larger object such as a vehicle than a smaller target such as a person.
- 4.64. Historically most targets will spend a small percentage of time with their vehicle and then decide to walk off in search of help. In areas that are familiar to the target this may be a successful strategy, but in most instances it results in death.
- 4.65. It is unusual for the SMC to be the first person on the scene of a SAR incident. Vital clues as to the direction, speed and condition of the target can be gathered from observations of their footprints or other markings in the immediate vicinity of a vehicle. Consideration should be given by the SMC to brief all teams about the possible destruction of clues around vehicles. When the target's vehicle is located one team member should approach it from the hardest surface possible to ascertain if there are persons inside or if notes or other information has been left. The area in the vicinity of the vehicle should then be thoroughly inspected for footprints and other marks and the direction in which they are going. Further planning can then be made on the information obtained. If there are no obvious signs left at the vehicle, then this would be used as a possible LKP with search planning concentrated on that point.
- 4.66. In featureless country it is almost impossible to navigate accurately without extensive equipment. A target will often aim to walk a straight path but in reality will wander. The handedness of the target will provide a clue the direction of the wanderings. Right handed persons will tend to walk in circles veering off to the left, with left handed persons going in right hand circles.
- 4.67. Mental condition will also play a significant part in the survival of the target. There are many stories of the explorers surviving tremendously difficult conditions without water for days. Historically this has been attributed to the harder living conditions and tougher life styles of those explorers. With the increased pampering of people today the physical ability to survive in harsh desert conditions has diminished. The mental state will have a large effect on a targets survival. Those with a 'no give up' attitude may have better odds of survival than a person with no will power.
- 4.68. **Arid Environment Behavioural characteristics:** Be aware that lost persons in arid conditions may exhibit any or all of the following:
- a. May shelter in or under their vehicle;
 - b. May dig themselves in under the sand, if experienced;
 - c. May discard their equipment;
 - d. May become disorientated – walking any direction;
 - e. May sleep by day and walk by night, if experienced;
 - f. Following a path of least resistance; and
 - g. May seek out river beds and ranges in search for water.
- 4.69. **Arid Environment Resource considerations:** The following resource considerations should be made:
- a. the use of indigenous trackers or visual trackers;
 - b. making air search a priority;
 - c. the use of trail bikes and helicopters;

- d. use of helicopters for transport of searchers and logistics supplies;
- e. hardening experienced Search Teams to the environment; and
- f. the use of ground teams to recover the missing person once located, unless a helicopter has access.

4.70. Mountain environment: Although Australia is considered the flattest of the world's continents it does contain some significant mountain areas with respect to SAR. Whilst about 10% of the country may be considered mountainous due to the elevation, a much smaller proportion contains areas of high relief that create substantial SAR issues. Due to the fact that many of Australia's mountain areas are National or Wilderness Parks they are often in close proximity to many of Australia's largest population centres.



Mountain areas are highlighted in light shades.

- 4.71. Mountain considerations: Access:** Many mountain areas are in wilderness or National parks. As such access into these areas is often limited. Resources in terms of searchers often have to trek great distances to reach their allotted search areas. Air support may not be available due to weather conditions, terrain or vegetation. Additional human resources may be needed to move equipment.
- 4.72. Communications:** Many of the mountain areas are not serviced by regular communication networks. It is important to liaise with emergency services that may be able to provide additional portable sites to improve forward net coverage. Even with additional radio communications, there will be no guarantee of continuous coverage. It means that briefings and operational instructions to Team leaders must be absolutely and thoroughly conveyed.
- 4.73. Containment:** It is almost impossible to contain an area in mountainous terrain to keep the target within it. The importance of continually monitoring trails, significant points, log books or known 'trap points' where persons could move through is essential.

- 4.74. TFFS:** In mountainous areas the targets are often adventurous, with activities such as bush walking, canyoning, trekking, rafting, abseiling and climbing. Often the report of a missing person will not be received until the person is well overdue. With many adventurous activities extending over many days, time becomes critical as injury or misadventure may well have occurred earlier in the activity. Therefore the missing person or group may well be approaching their TFFS by the time emergency services are notified. Search strategies that emphasise fast and reconnaissance methods are indicated.
- 4.75. LPB:** Persons who venture into mountainous areas are often motivated and aim to achieve a task. Ascertaining as much data as possible regarding the MP will enable the SMC to determine the likely characteristics of the person. Often these persons are trail orientated and will seek water and/or shelter if injured.
- 4.76. Vertical Rescue:** Where called to search areas of high relief for missing people it is advisable to ensure that emergency services with skills in Vertical Rescue are placed on Alert or called to be part of the search so as not to delay the arrival of these trained operators should they be subsequently be needed.
- 4.77. Training:** High levels of fitness and resourcefulness are needed as Mountain search crews may well be deployed not only in difficult terrain but over protracted days without opportunity of relief in often poor or changeable weather. Excellent navigation and map reading skills are required in any search team. The ability to effectively use GPS technology should also be considered as a skill within each search team.
- 4.78. Mountain Environment Search Strategies:** Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, PLS, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.
- 4.79.** Many mountainous area and lookouts contain logbooks or visitors books. It is imperative that these are checked as soon as possible in an effort to narrow down the search area.
- 4.80.** Set up a forward net communications as soon as possible.
- 4.81.** Postpone a general search strategy until there is clear evidence or a definite clue to the missing person's whereabouts. (eg. Found backpack, clothing, footprints etc.) Be flexible about search team sizes, eg. A team of 2 where communications is excellent across most of the area being searched, a team of 3 where communications is intermittent and a team of 4 where communications is poor or marginal.
- 4.82.** A search team of 3 is a very flexible team size as this size can strike a good balance between rapid movement and deployment and team security. A team of 3 can search in a Single File, Track Sweep, Point and Flank and Purposeful Meandering.
- 4.83.** Use the 'call and listen' techniques. Note that in calling from a ridgeline, the sound will not travel down the sides of a ridge or spur, sound will only travel out to the facing slopes. It is important to therefore call out from opposite ridges into a valley.
- 4.84. Dangerous animals:** Australia is known for its wildlife and every year thousands of locals and tourists gravitate to wildlife parks to view and hold our cuddly furry creatures. It is not these that searchers need to worry about, it is the more unpleasant looking critters that cause the problems.
- 4.85. Saltwater Crocodiles:** The Australian Estuarine or Salt Water Crocodile is found across the entire north of Australia as per the below map. They are the largest reptiles in the world growing up to 5-6 metres in length. The Salt water name is a misnomer as they are quite

happy in fresh water billabongs long distances from the coast. They are very aggressive and territorial. While their normal diet consists of wild pigs, water buffaloes, cattle and horses they will also eat the occasional human. On average 1-2 people are devoured by crocodiles somewhere in Australia per year.



- 4.86.** When searching in areas known to be inhabited by crocodiles it is imperative that all members of a search team keep a very good look out. It may be worth while having a member of the State/Territory Parks and Wildlife Service or Crocodile Management Team accompany any search team as they will be able to identify crocodile habitats and signs of recent crocodile activity. A firearm may also be prudent in some circumstances, but only at the instruction of the SMC.
- 4.87. Snakes:** Australia has a great many of the world's most venomous snakes and apart from the colder reaches of the Tasmanian and mainland Alps they can be found just about everywhere. Very few snakes are aggressive towards humans by nature but all will respond to being trodden on, poked and prodded. Most will slither away from searchers long before they are spotted but occasionally a snake will be caught out in the open by an unsuspecting team member. Common sense prevails in most situations. Remain calm and still and let the snake leave the scene under its own steam. Do not try to pick one up or hurry them along. In the heat of the moment it is difficult to identify the harmless from the dangerous. Treat all snakes as being dangerous and remember that they are protected.
- 4.88.** If bitten by a snake remain calm. Have another team member commence first aid in the form of a pressure immobilisation bandage and immobilise the area. Seek medical assistance. Do not wash the area as any residual venom may be able to be identified. Most major hospitals carry anti-venom for snakes in their area. Where possible identification should be made of the snake that caused the bite but do not attempt to apprehend the snake as another bite may result.
- 4.89.** Be aware of what snakes are likely to be encountered within a search area.
- 4.90. Spiders:** There are a wide range of venomous spiders scattered throughout the country, all of which do not actively stalk humans. Most spider bites arise from the spider being disturbed. Wearing gloves when searching undergrowth, under objects or back yards and stout footwear will prevent many potential spider bites. If bitten by any spider seek medical attention as soon as possible. Identification of the spider can assist with any medical treatment provided.
- 4.91. Scorpions, Centipedes and Millipedes:** As per spiders these creatures can be located throughout Australia. While all of them are not poisonous they can all cause a very nasty sting. Gloves and footwear will prevent most encounters from turning nasty.

Tasmanian Devil, Dingoes, Foxes, Goannas, Monitors, Birds of Prey: While not dangers these animals have one SAR related characteristic, they all feed on dead or decaying animals, including humans. If it is possible that a MP is deceased then there is a possibility that local animals have had the opportunity to devour some or all of the flesh and to scatter the bones. This may be the case with a person missing in the outback or more remote areas. The SMC should be aware that this detail should be included in the briefings, for teams to also look for scattered human bones and remains.

4.92. Telephone Triangulation: With most people now carrying mobile telephones the potential for telephone triangulation by the various telephone carriers can reduce SAR efforts dramatically. During the information gathering stages it should be canvassed as to whether the MP has a mobile telephone with them. Something as simple as making a telephone call, sending a text message or leaving a voice message may resolve a SAR incident. If these methods do not produce results, contact with the service provided can often produce a location or direction from a mobile telephone tower. The individual State/Territory methods in contacting service providers will differ, as will any charges that are made by these providers. If the MP is in an urban area and their telephone is on, a triangulation can be reasonably successful within a small space of time. A large number of mobile telephone towers in an area can produce a very defined search area, whereas a small number or only one tower will produce a much larger search area, such as a bearing and distance from a particular tower. MP's lost in rural, mountainous or remote areas may have little mobile reception, with an associated small chance of triangulation. Mobile telephones with dead batteries will not be of much use. A triangulation should be requested as part of the initial intelligence gathering.

4.93. Estimating the Missing Person Location: The search plan consists of two components:
 1. Reflex Tasking (Initial Search)
 2. Formal Land Search.

The search response has been separated into two distinct actions; Reflex or Initial actions and a Formal Land Search. The reflex action is exactly as it says, an instinctive search of those areas near the LKP or IPP where the MP could have met with trouble. The formal search is one utilising the four search strategies as discussed further in this section.

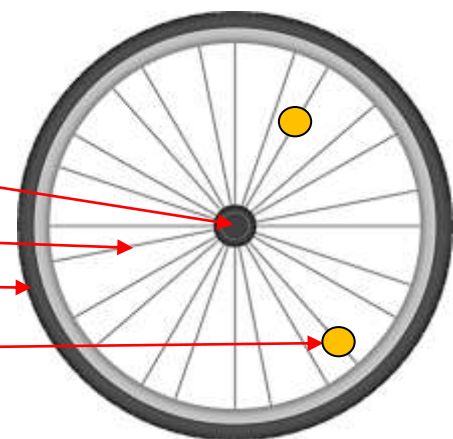
Reflex Tasking

Hub = 300m radius around Last Known Position (LKP), Place Last Seen (PLS) and Initial Planning Position (IPP)

Spokes = Possible routes or paths

Tyre = Limit of initial search, LPB statistical boundary.

Reflectors = Places of high probability, huts, hazards, track junctions.

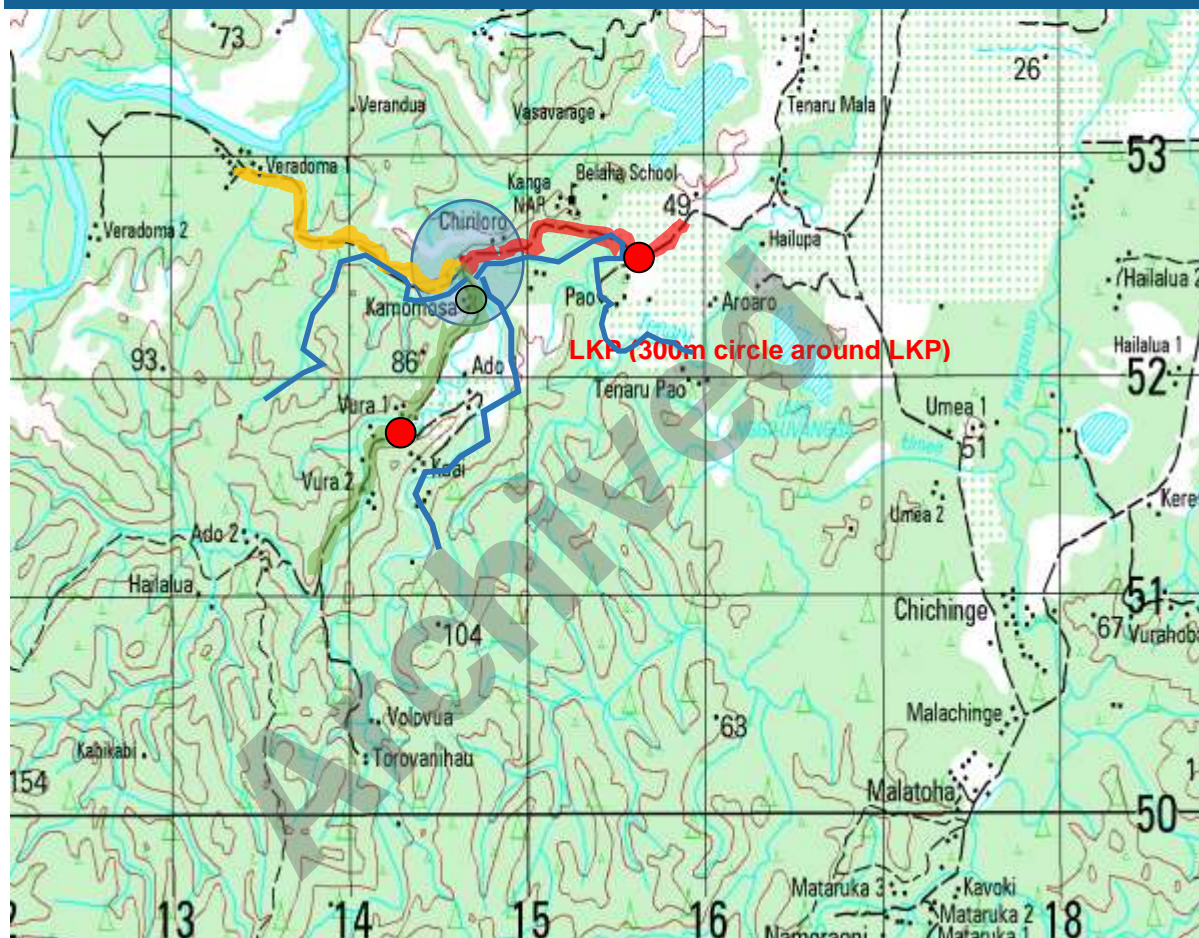


Bicycle method for Reflex Tasking

Reflex tasking can be likened to a bicycle wheel with the hub situated on the LKP or IPP. The spokes represent the various routes, tracks, trails or directions that could have been taken by the MP. The tyre represents the limit of the reflex search which is recommended at 300-500m. The reflectors represent places of high probability within this reflex area. These could include huts, track junctions, hazards, lookouts, cliffs and water courses. The below diagram illustrates this concept. There are six identified possible routes, 3 tracks radiating from LKP and three water courses. Without any further intelligence each is as likely as the others. The circle around LKP is a 300-500m radius for the reflex search. The green reflector is an area of

high probability inside the reflex search area (Group of huts) while the red reflectors are high probability areas, track junctions, just outside the initial search.

Reflex or Initial Search Tasking
 Hub = 300m circle around LKP/IPP/MPP
 Spokes = Routes/tracks/trails/ridges emanating from hub that MP could have gone
 Rim = Confinement if needed
 Reflectors = High probability areas



Reflex tasking example

Formal Search

There are four strategies in determining the formal search area in a land environment:

- a. Theoretical (How far could the MP have travelled in the time period)
- b. Statistical (Using Lost Person Behaviour, what is the statistical distance the MP could be located within)
- c. Subjective (Using the terrain to determine likely search areas)
- d. Deductive (Looking closely at the facts, clues and assumptions)

Each of the methods are laid over each other to give a very accurate representation of the situation, and if done correctly will serve to reduce the search area to the highest probable locations.

- 4.94. Theoretical:** The first step in land search planning is to determine the limits of the area containing all possible MP locations. This is usually done by determining the maximum distance the MP's could have travelled between the time of their last known position (LKP) and the known or assumed time the SAR incident occurred. By utilising Naismith's Rule a

general indication of the maximum distance that could be travelled by the MP will be obtained. Using this as the radius a circle can then be drawn around the LKP, which will indicate the maximum distance the MP will have walked from the LKP. This method only works when it is known that the MP does not have access to other forms of transport. Knowing the extreme limits of possible locations allows the SMC to determine where to seek further information related to the MP's and whether an incoming report might apply to the incident. However, systematic search of such a large area is normally not practical.

4.95. Naismith's Rule: In gauging the speed of travel, Naismith's Rule describes the distance a person may travel per hour over **flat terrain** and was devised in 1892.

5 km/hour Easy going over open country.

3 km/hour Easy scrambling over rocky ground.

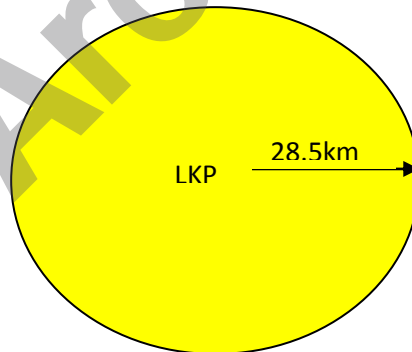
1–1.5 km/hour Difficult going through thick scrub, heavy sand or snow.

Where a person is missing for extended periods or is likely to traverse hilly country, the possible search radius will need to be reduced due to fatigue and slower travel. For each 500 metres of ascent or 1000 metres of descent over the estimated distance travelled, reduced the possible search radius by the equivalent of one hour travel. For every 5 hours the person is missing, reduce the possible search radius by the equivalent of one hour travel for fatigue. The calculation for the possible distance travelled by the MP is relatively simple to perform. **Appendix J & K** expands on Naismith's Rule and provides further information.

Example. A 6 year old MP has been missing 13 hours in the Lamington NP. The intended route suggests medium conditions or easy scrambling (3kph) with a 500m ascent and a 500m descent.

13hrs missing-

1. Calculate any fatigue by dividing the time missing by 5 and ignore any remainders. $(13 \div 5 = 2 \frac{3}{5} = 2\text{hrs})$ $13\text{hrs} - 2\text{hrs} = 11\text{hrs}$
2. Calculate any ascent. $500\text{m} = 1\text{hr}$. $11\text{hrs} - 1\text{hr} = 10\text{hrs}$
3. Calculate any descent. $1000\text{m} = 1\text{hr}$ ($500\text{m} = .5\text{hrs}$) $10\text{hrs} - .5\text{hr} = 9.5\text{hrs}$.
4. Calculate distance travelled. $9.5\text{hrs} \times 3\text{kph} = 28.5\text{km}$
- 5.



Theoretical search area using Naismith's Rule.

4.96. This initial calculation provides the SMC with a possible distance that the MP could have travelled in the time since they were last seen. It does not provide a direction or take into account any other factors, including age or behaviour, at this stage. This area is much too large to search adequately, being approximately 2550km². Being a theoretical distance it is highly probable that this distance would not be walked in a straight line but that the MP would wander somewhat and cover a shorter linear distance from LKP.

4.97. Statistical Method: Lost Person Behaviour: This method relies on Lost Person Behaviour (LPB) to determine the distance that the MP may have travelled from the LKP. By analysing the behaviour of past lost persons in similar situations, it may be possible to 'predict' what the subject now being sought might do, where he/she might go or where he/she might be.

This concept is a search planning tool, dealing with generalities, and not absolutes. Lost person behaviour studies provide the SMC with two important items:

- a. Behaviour traits of lost persons by category.
- b. Distances travelled by specific categories of lost person.

4.98. General categories of Lost Persons: The following are the commonly used categories of lost persons:

- a. Children 1 to 6 years
- b. Children 7 to 12 years
- c. Adolescent Youth 13 to 15 years
- d. Elderly- above 65 years.
- e. Mental Development Problems.
- f. Despondent
- g. Bushwalkers
- h. Dementia/Alzheimer's

Appendix I contains lost person behaviours in the above categories and provides statistical distances travelled by members of each group. This will be useful in creating the linear graph as outlined below.

4.99. Pertinent characteristics set each category apart. Although each of the groups exhibit specific traits, there are always exceptions and good search strategy concentrates on the most likely. The statistics provided further on relate to the activities of 80% of persons in each category. Knowledge of the actions of the remaining 20% of persons in each category may be useful in planning for search containment. Appendix I

4.100. An Australian LPB study was conducted between 2000-2006, details of which are contained at site <http://sarbayes.org/natsar.pdf>. The statistics used in this manual are a combination of those developed in Australian, USA, Canada and the United Kingdom. While these statistics will provide a solid base upon which to base a Statistical Search method there are some discrepancies when used for Australian subjects. Studies to date have found that due to the more favourable climate in most of Australia and the more outdoor nature of Australians their behaviour when lost is somewhat different, in that they will often attempt to self help more often. Bearing this in mind, the international statistics can be used with confidence as one of a number of search planning methods.

4.101. Specific factors of LPB that may affect search planning: State of Health: The physical health of the lost person will have a direct impact on their ability to self help and formulate rational decisions. Recent illnesses, poor fitness, disease, lack of adequate nutrition and lack of sleep will restrict a person's ability to cope with situations such as being lost in an unfamiliar environment. Increased physical stress will result in fatigue and exhaustion setting in, reducing the ability to think clearly. Good physical health may be an indication of an ability to withstand the rigors of being lost.

4.102. Past Experiences: Studies have shown that persons who often challenge themselves in new ways or expand their comfort zones will be more adaptable to adverse situations, such as being lost. Gathering evidence of past experiences will provide an insight as to the missing person's ability to cope with challenging or stressful situations. A person who rarely does or tries anything new may be more likely to be helpless and a liability when lost.

4.103. Physiological effects of the environment: While it is acknowledged that extremes of heat and cold will have a detrimental effect on a missing person, a combination of normal temperatures with rain and/or wind will quickly have adverse effects on a missing person. Wind and wet chill can quickly lower the core body temperature, and will cause a person to seek shelter which will limit their detectability by searchers. Hypothermia has been identified as a leading cause in death and accidents in the outdoors from a search and rescue perspective. Persons suffering from either hypothermia or hyperthermia become

irrational and lose the ability to help themselves. Altitude exacerbates any effects of these debilitating conditions.

- 4.104. Fear factors:** An aspect that is often overlooked with respect to missing persons is general fear. Fear can be categorised as five basic types; fear of being alone, fear of the dark, fear of animals, fear of suffering and fear of death. A SMC must take these fears into account when planning a SAR mission, not just from a lost person point of view but also from a searcher viewpoint.
- a. Fear of being alone:** In Australia this could also be termed fear of the bush. While some people choose the isolation of the bush the average person finds it haunting. The bush, and this term covers everything from the central deserts, coastal rain forests, snowy alps, eucalypt, brigalow and gidgee forests and northern swamps, is a very harsh and difficult place to survive adequately. Most of the continent has very little surface water and native foods are difficult to safely identify.
 - b. Fear of the dark:** Most humans have a primeval fear of the dark. This coupled with the noisy nocturnal activities of most native animals makes the bush darkness a stressful place to be. Compounding this is the general loss of our most important sense, sight. Without being able to see objects in the darkness our imagination can often conjure up images that can cause the strongest to be afraid. This sensation is not confined to lost persons, as it also has an effect on searchers. Those searchers on the extremes of any line search will eventually creep closer to the centre because of this fear of the dark, hence a 100m wide search initially will eventually diminish to cover a much smaller area. It is amazing how a small amount of light, from a torch or fire, can alleviate this fear.
 - c. Fear of animals:** Although Australia has no known predatory animals that actively prey on humans there is an irrational fear of being in the bush alone. Most native animals are nocturnal and their nightly activity can unnerve people and preclude a good night sleep.
 - d. Fear of suffering:** The spectre of survival can cause an often rational fear of suffering in lost persons. Australia is an extremely harsh continent, not designed to support lost persons. The possibility of dehydration, starvation, hypo- and hyperthermia, illness and injury are all real possibilities, and there are many examples of each throughout our history. The thought of the lingering agony of each situation can create a very real fear among some lost persons.
 - e. Fear of death:** The fear of a lingering death can haunt many people, particularly when they consider the many things yet to do; leaving loved ones behind, tying up loose ends and the hereafter. In some instances the fear of death can actually hasten it.
- 4.105. Biological Cycles:** These cycles have been recognised in the medical world for many years and do have some application to search and rescue. Most humans go through a cycle of highs and lows which can vary from periods as short as a day to periods of months. A person on a high cycle may see being lost as a challenge to be met head on. These people will attempt to self help and have a greater chance of survival in adverse conditions. Conversely, a person on a low cycle may have little energy to assist themselves and may succumb to conditions more quickly.
- 4.106. Behaviour while lost:** The recognition of being lost occurs at different stages for people. It may be the slow awareness that it is taking far longer to reach a destination than was calculated or the instant realisation that what was once familiar territory is now not. A lost person can go one of two ways; sit tight and quietly reflect the situation and work out a solution or to hasten their pace as the destination 'could just be over the next hill'. This second situation can then also go in two directions; the realisation that they are getting further into unknown territory and sit down to reflect the situation or to increase their pace and run to avoid the fear of the bush, which now appears to be closing in around them. In other words they are panicking.

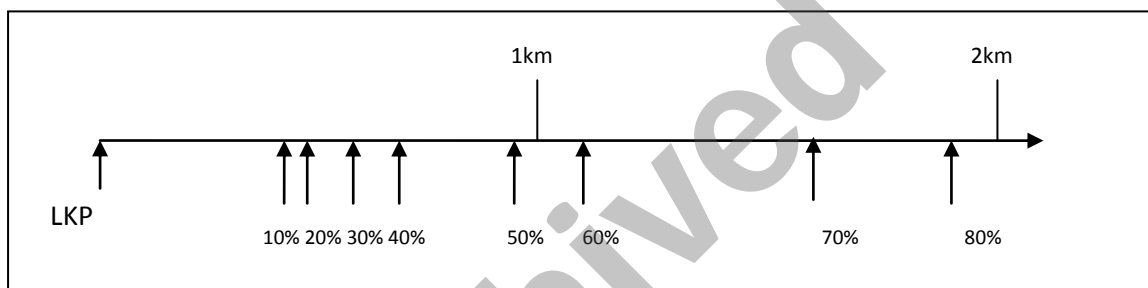
- 4.107.** Those persons who take the time to ponder may identify their location and self help to safety. If this is not possible they will often form a shelter and wait for rescue.
- 4.108.** Those who are compelled to continue in a blind rush often find themselves injured in locations often far removed from their original intended track and therefore take longer to locate and rescue. It is worth considering that these people may often attempt to travel up hill to either locate a path or orientate themselves to their environment before fatigue, despair and/or depression takes over and they tend downwards on the path of least resistance. These people will often take risks beyond their capability and as a result suffer more injuries than would normally be expected.
- 4.109.** In both the above circumstances shock will be suffered by the lost person. This will manifest itself in many different ways depending on the person's mental strength, from simply forgetting incidents that have occurred to failing to seek shelter from rain or snow.
- 4.110.** The trauma of being lost may also have the following effects on a lost person:
- a. Not seeking shelter. Many persons do not make an adequate shelter nor build a fire for warmth. With hypothermia and hyperthermia being very prevalent, particularly in desert, mountainous and urban areas, this is a vital necessity and will extend a person's chances of survival. Survivor questioning has often elicited the assumption that it is not worth the effort of making a shelter even if it will limit heat loss and provide a measure of mental comfort.
 - b. Many persons discard their equipment without thought for using it to survive. While it is true that most lost persons are not prepared for the conditions as they only expected to be out for a few hours, there have been many instances of people being extremely well prepared and failing to use the items that had with them, particularly tents and fire making apparatus. Discarding clothing and backpacks is common and may be contributed to the shock of being lost.
 - c. Many persons discard their clothing while wandering in the bush. This may be because of overheating in warm areas, but soon becomes regrettable as the sun sets and the temperature cools down. While understandable in hotter areas it also happens during the early stages of hypothermia in colder areas. The net benefit of discarding clothing is that the lost person succumbs sooner.
 - d. Often with the shock of being lost is the sense of abandonment, the feeling that nobody is looking for them. Throughout Australia a search mission will be commenced once the alarm has been raised by a concerned party. If the SMC has an itinerary and LKP then the task of locating the MP is much easier. If there is no itinerary, no LKP and the MP has not been seen for some time then the task is that much harder.
 - e. Self helping and responsiveness is a big factor in determining what type of search to opt for. A MP wearing bright clothing and actively seeking assistance will be easily located when compared to a small child dressed in dark clothing hiding in the undergrowth for shelter. Children are often taught 'stranger danger' and are reluctant to approach a stranger in these circumstances. MP suffering shock or other mental issues may make no attempt to draw attention to themselves even if they see a searcher, motor vehicle or helicopter.
 - f. Ignoring aids such as tracks, paths and fences is a common problem associated with MP's suffering shock. Common sense dictates that if a MP locates one of the above it will lead to a main road, gate or house where help can be obtained. On many occasions a MP will cross a track, path or fence, often without realising it, only to be further lost in an area outside a high probability search area.
- 4.111. Statistics:** The Lost Person Behaviour statistics have been put into a tabular format showing the average distance at which a variety of person groups have been located in relation to

LKP. The tables cover all of the statistics but is suggested that the statistics to 80% only be used as the remaining 20% of targets skew the figures as can be seen.

4.112. Creating a linear percentage line as below will provide a visual representation of the distances that a MP could be located. The table of figures for 1-6 year old children have been reproduced below. This table shows that 10% of missing children in this group were located within approximately 470 metres of LKP. It also shows that 80% of children in this age group were located within approximately 1.89km of LKP. Using these figures a linear graph of the respective percentages can be shown in a form that more easily translates to map distances. The SMC can place LKP over the position on a map and then draw circles of various sizes to represent the statistical distances travelled by children of that age group.

% of MP's	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Dis from LKP (KM)	0.47	0.54	0.61	0.72	0.95	1.16	1.51	1.89	2.27	2.65

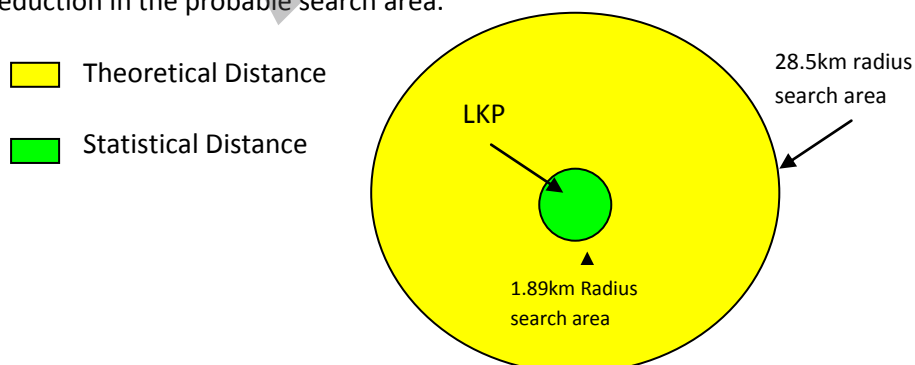
Statistical distances travelled by Children 1-6 years (Contained in Appendix I)



Linear graph of LPB statistics of Children 1-6 years.

4.113. Using the LPB tables to produce a Linear Percentage line a SMC can observe that statistically 80% of missing child between 1-6 years of age will, on average, be located within 1.89km of the LKP. Using the statistical method the initial search for a child of that age will be a circle with a radius of 1.89km.

4.114. Superimposing this search area over that of the Theoretical method will show a dramatic reduction in the probable search area.

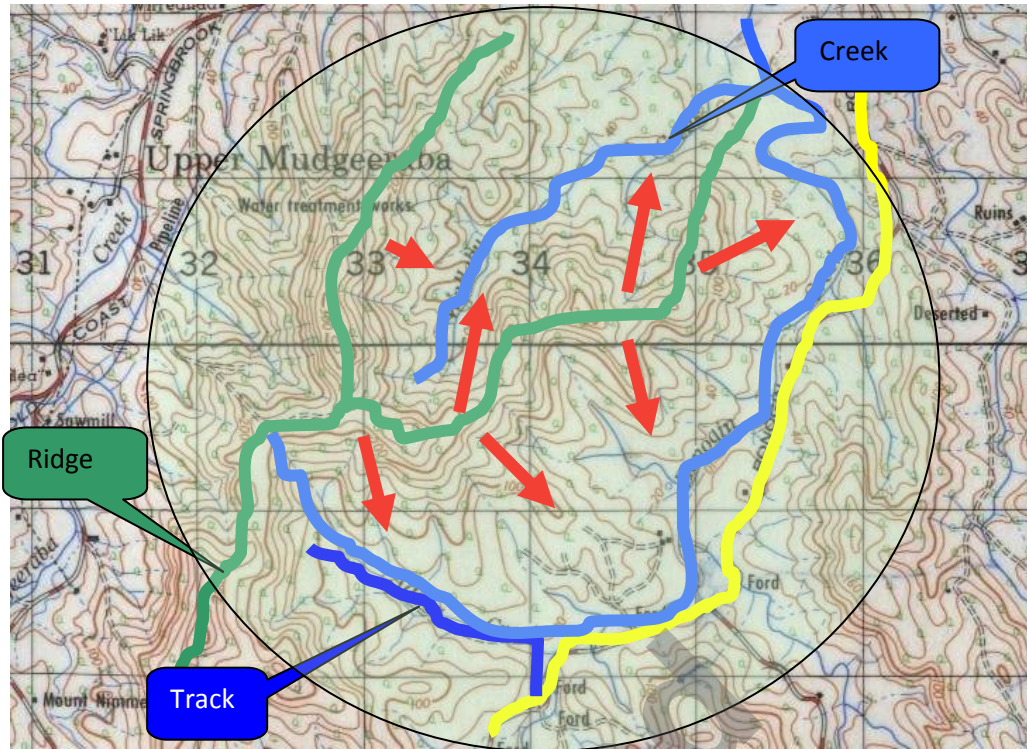


Comparison of Theoretical and Statistical search areas

4.115. The probable search area has been reduced from approximately 2550km² to approximately 11.2km² based on the first two of the planning steps. Using the theoretical method it is possible, although not likely, that the child has walked 28.5km from LKP in the 13 hours they have been report missing and this is portrayed in the yellow circle above. LPB suggests that 80% of all children of this age lost have been located within 1.89km of LKP, represented by the green circle. The SMC must always be cognisant that there are 20% of children in the

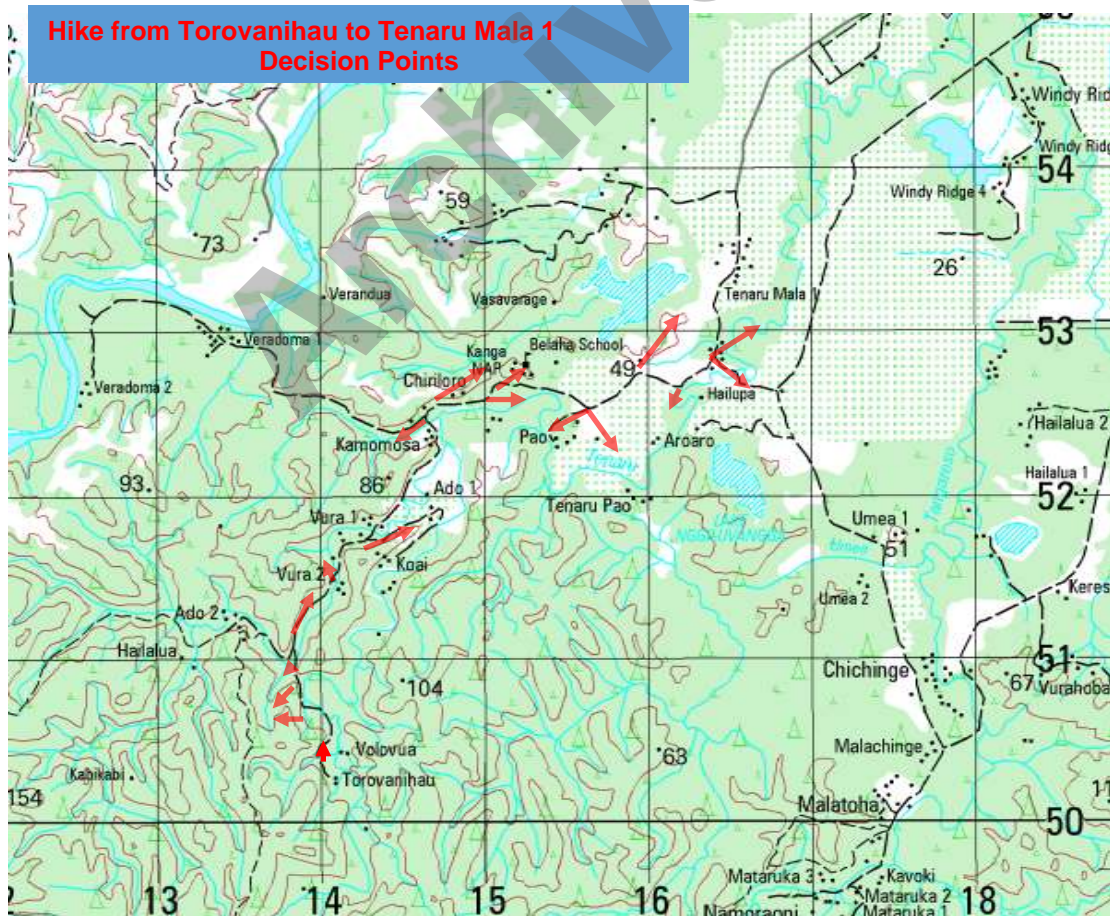
age group that were not located within that distance due to other circumstances. Continued intelligence gathering will assist in determining whether the MP fits into the 80% or 20% category. While the statistical area is considerably smaller than the theoretical area it is still an extremely large area to search on foot.

- 4.116. Subjective Method:** The subjective method uses the terrain, boundaries, fences etc as a method of identifying a search area. As most categories of targets tend to take the path of least resistance, ie. walk down hill, identifying the lay of the land will suggest funnels that will channel a target in a particular direction. This method will differ from person to person.
- 4.117.** The reduction of the **possible** search area to the **probable** search area requires the evaluation of factors of the missing person that may reduce their distance travelled, and terrain features and their effects:
- a. Factors which may reduce the projected travel may include:
 - (1) physical condition;
 - (2) age and sex;
 - (3) experience in the area and general outdoor ability; and
 - (4) weather.
 - b. Certain terrain features may also assist in reducing the search area to only a sector of the original circle of the possible search area. For example, features which cannot be crossed or only crossed with difficulty, (fast-flowing rivers, gorges, cliffs, shorelines or very dense scrub) can significantly limit the area which must be searched. The probable search area may only be a fraction of the possible search area when all these factors are applied.
- 4.113.** On the below map the search area has been identified by the circle. The roads, tracks, creek and ridge lines have been identified and coloured for clarity. These are all potential barriers for use in search planning and could be used to funnel a target to lower country. They also reduce the initial size of the search area. The contours have been checked and the downward slopes identified with red arrows. This may indicate possible directions that a missing person will travel. Using this information it is now possible to contain a search area and divide it into smaller sub search areas for individual searching.
- 4.114.** Once the salient terrain features have been identified it is possible to locate 'paths of least resistance' or 'funnel points' within your search area. The former are routes, normally downhill, that a lost person will subconsciously take while still mobile. Imagine a lost person, tired, demoralised and unable to rationally make a decision, they will naturally gravitate down hill, taking a path that does not offer them any trouble. This path may not be direct and will tend to wander, but always downhill. In these circumstances a barrier search is a worthwhile consideration. Funnel points are exactly as named, locations that tracks, gullies or ridges converge. This has the effect of funnelling persons in a particular direction. Re-entrants are a good example of this. A person lost in a re-entrant will often remain in it, following it down hill, being funnelled to another location. Being able to identify these potential routes will assist in allocating areas to search teams.



Identifying possible barriers in a search area.

Decision Points



The above diagram shows what a decision point is. Whether the MP is walking on formed tracks or wilderness they will come across a number of decision points that will require

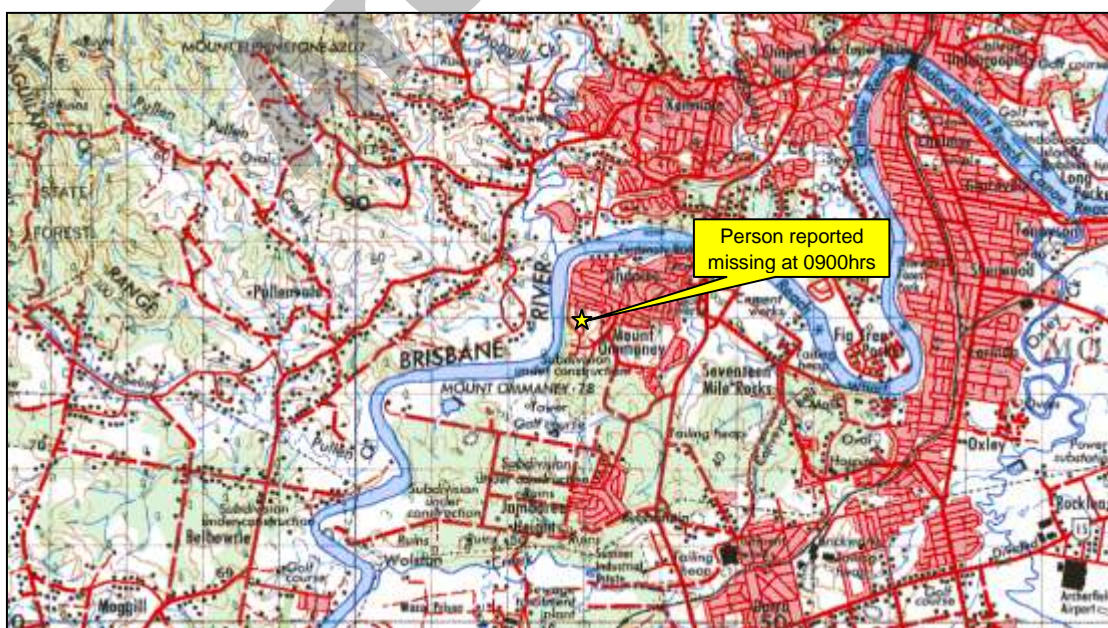
identifying and searching. A decision point is a location where the MP could veer off course or lose the track or bearing entirely. Track junctions are a classic example, with the MP going left instead of right due to a number of reasons such as poor map skills, darkness, inattention and/or fatigue. Other decision points include water crossings, sharp bends in tracks or routes, contouring and elevation changes. The result of poor decision making will leave the MP disorientated

4.115. Deductive Method: This method relies on the SMC looking at all the clues and information provided and making some deductions or assumptions on what the missing person was doing and where they may be. If the MP was an avid photographer then locations for photography may identify areas for a FAST search, similarly if an MP is into abseiling then local abseiling locales will be worth searching.

4.116. Where the direction of travel of the missing person is known or suspected from sighting, from intentions, or from clues found, the search area may be reduced. However, the missing person may have altered direction intentionally or may not be able to maintain a particular direction. Deductive is not a method to use alone, it must always be corroborated with some other search intelligence.

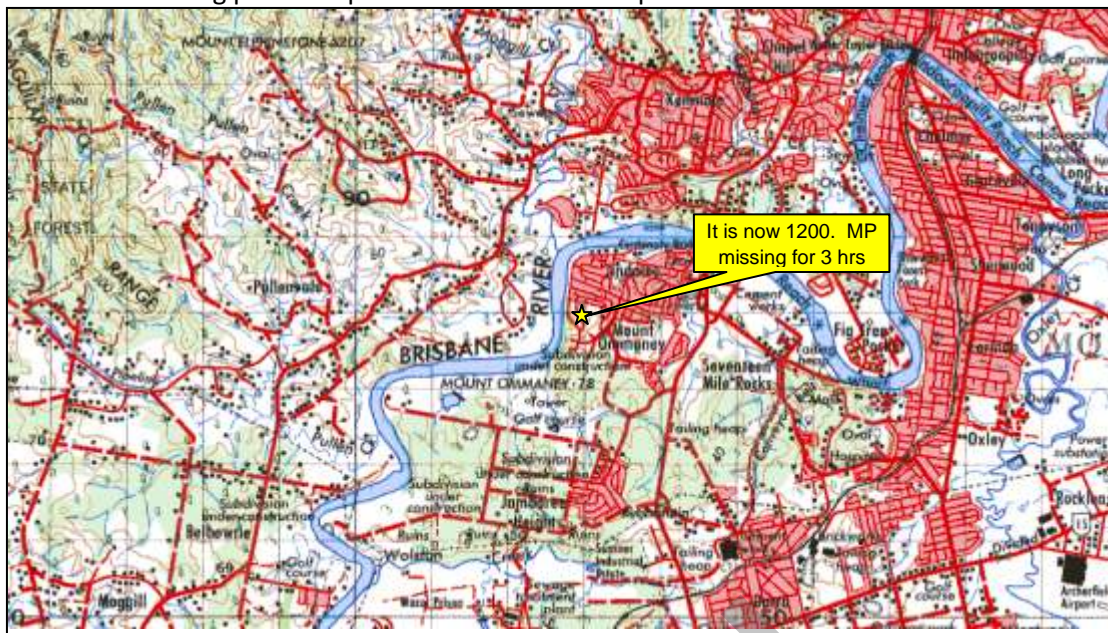
4.117. It is now possible to utilise all four search planning methods to determine a possible search area, or area of highest probability. For example:

Scenario 1: It is 0900hrs when the following information is received. A 78yo dementia sufferer has gone missing from her home at 30 Brisbane St, Mt Ommaney. She has no history of going missing before. She has lived at that address for over 30 years but due to illness does not know the address. She has no money or ID and was last seen at 0600hrs wearing a cotton night dress and no shoes inside her residence. She is not a good walker but does not require any walking aides. The weather is a typical winter day, wind 15kph S, 15°C and drizzle.



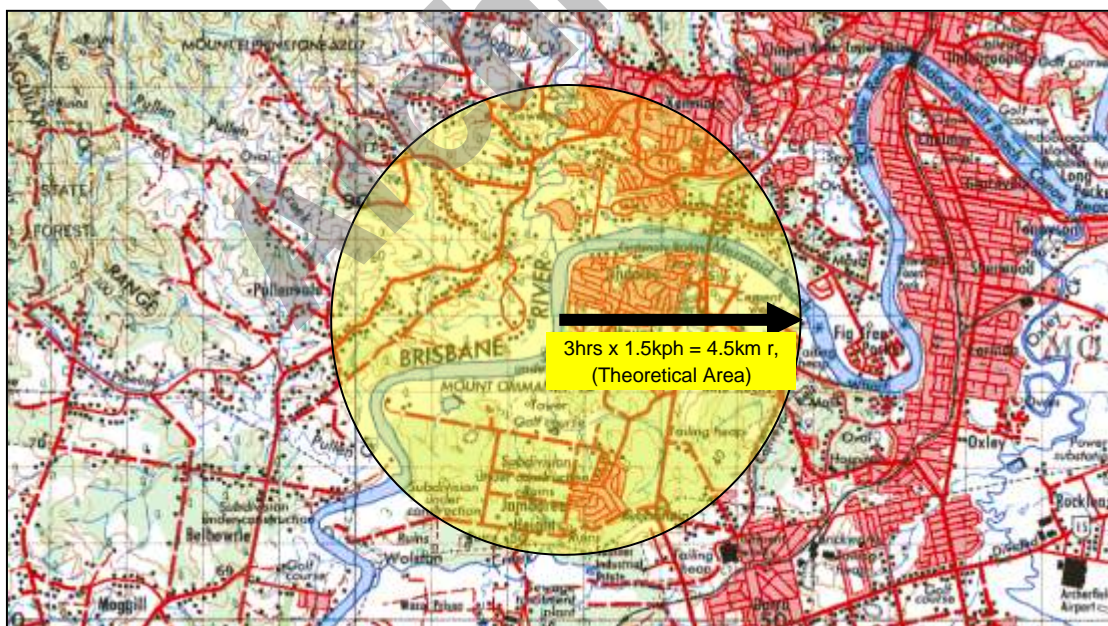
LKP of missing person identified.

4.118. The LKP of missing person is plotted on a suitable map.

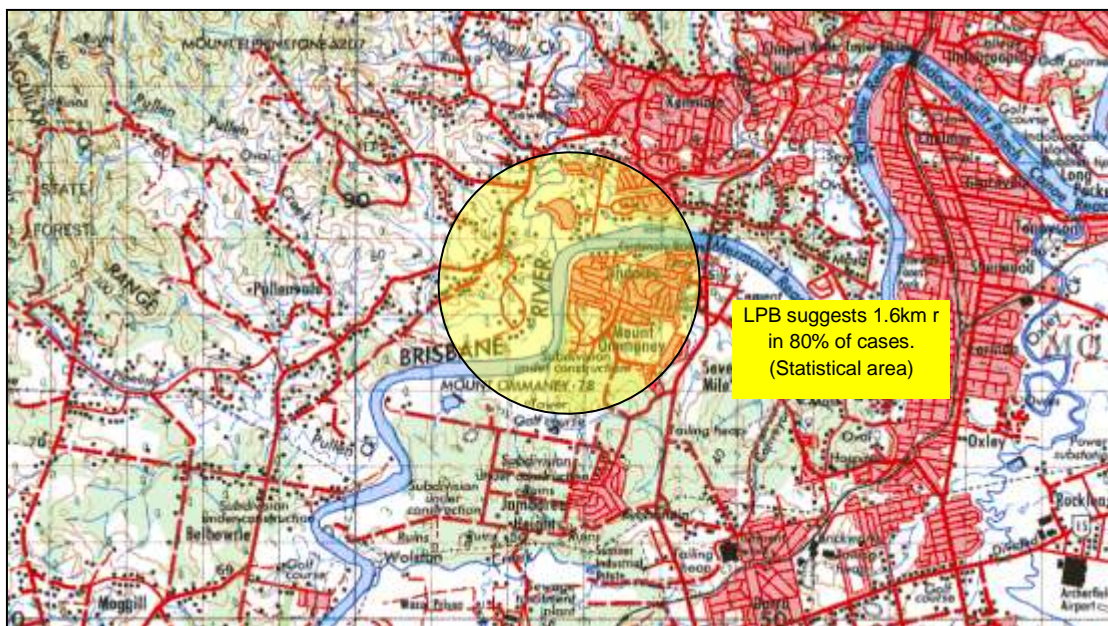


3 hours missing.

4.119. It is now 1200hrs and the MP has been missing for 3 hours. According to Naismith’s Rule, a person could walk about 5kph in suburban terrain; this rule does not differentiate between ages or ability. A speed of 1.5kph is more reasonable for an MP of this age and condition. Therefore 3 hours x 1.5kph will give a theoretical distance of 4.5km. Draw a circle with a radius of 4.5km around LKP and this will provide the theoretical search area for the MP.

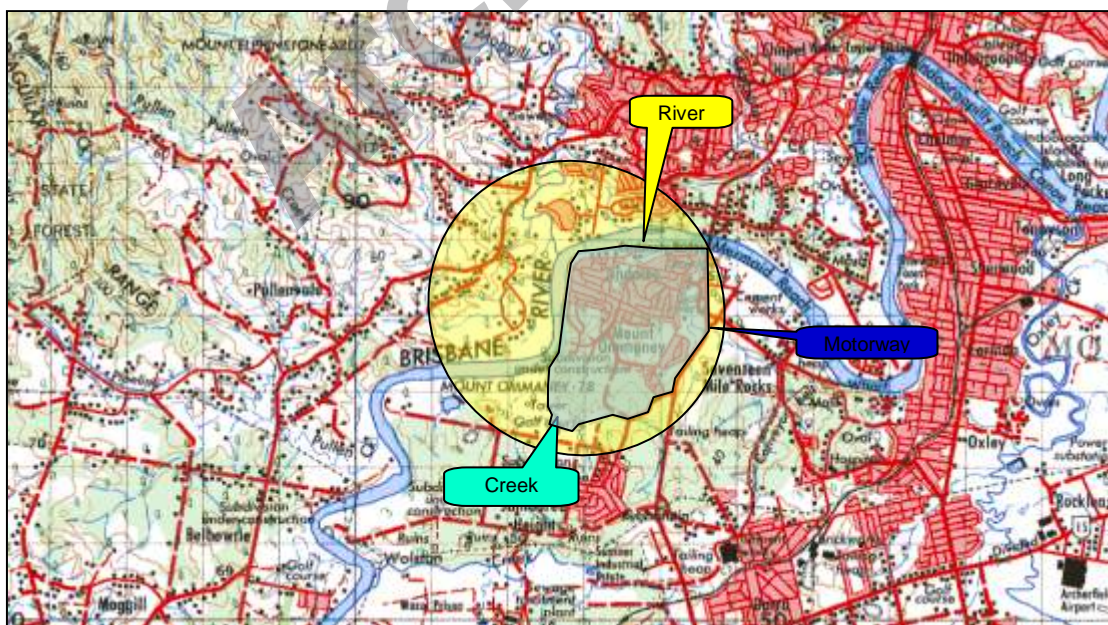


Theoretical Area plotted.



Statistical Area plotted.

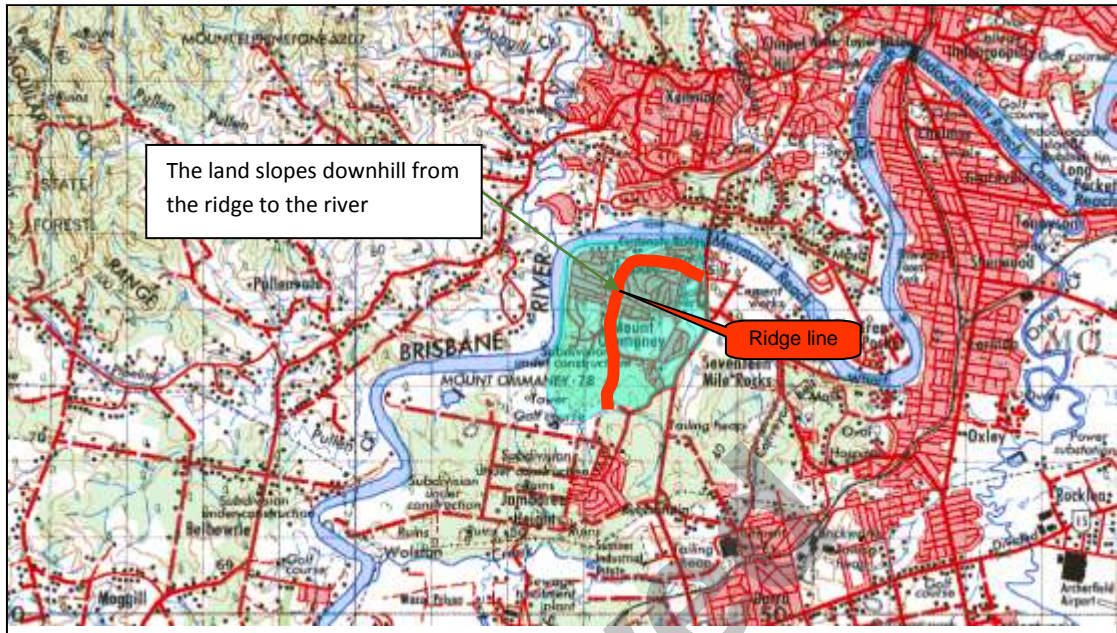
4.120. Lost person behaviour for dementia or Alzheimer suffers suggests that 80% of MP in that category have been located within 1.6km of LKP. Using this information draw a circle of radius 1.6km around LKP. This has reduced our search area by a considerable amount, based of statistics of previous lost people. It is necessary to keep in mind that this is only a statistical measurement and that of the studies there were 20% of MP's who were located outside of this circle. The SMC must devote a portion of their planning to this until intelligence suggests otherwise.



Subjective search area plotted.

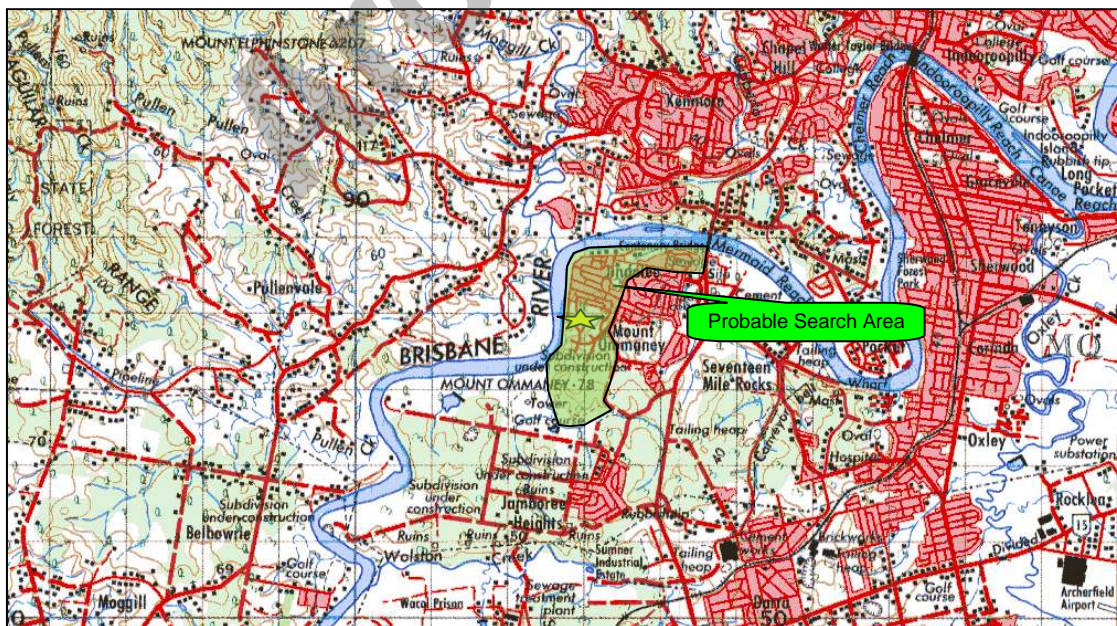
4.121. Use the subjective method and look carefully within the 1.6km circle. A number of defined boundaries can be seen and marked. These will include the Brisbane River, a creek and the Western Motorway. It is a reasonable assumption that a missing person will be contained within these boundaries. They are considerable boundaries and clearly mark the area. It has

to be remembered that there will be a small percentage of MP's that will pass through or over any boundaries. Using the above boundaries, it is now possible to reduce further the search area for our MP, in blue above.



Deductive Search Area plotted.

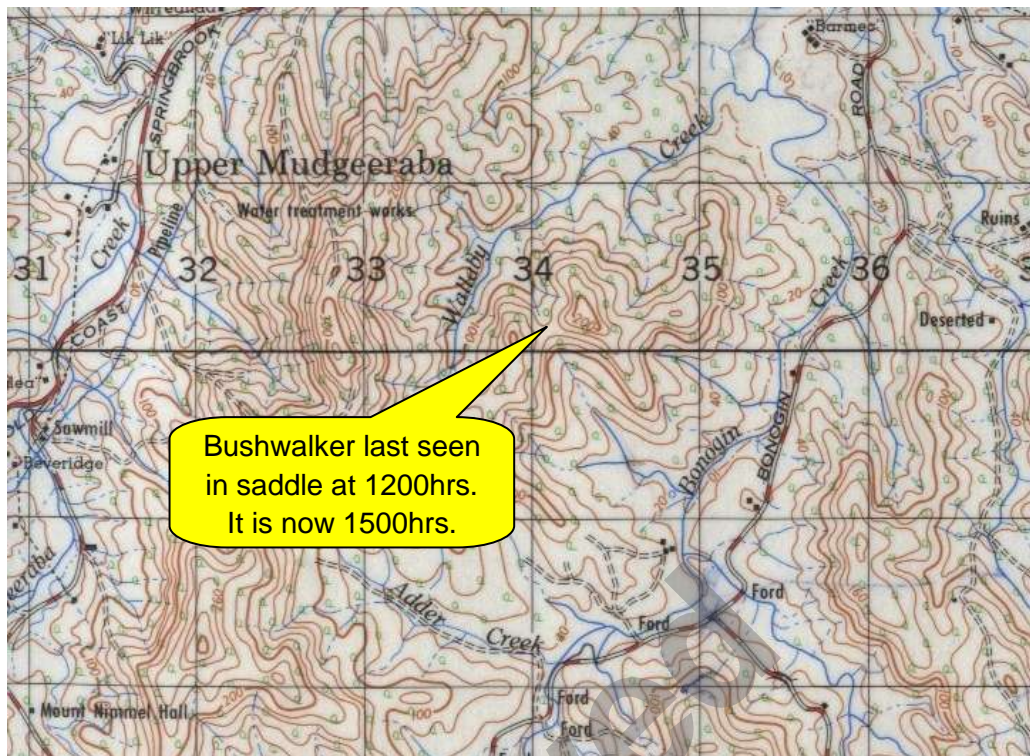
4.122. A deductive look at the map will show that there is a ridge, identified in red. The land slopes downward toward the river on the west and north of this ridge. An assumption is that an elderly MP who is experiencing walking difficulties will not walk uphill and will seek the path of least resistance, gradually going down hill towards the river. This assumption should be accurately recorded within your log to justify your search plan.



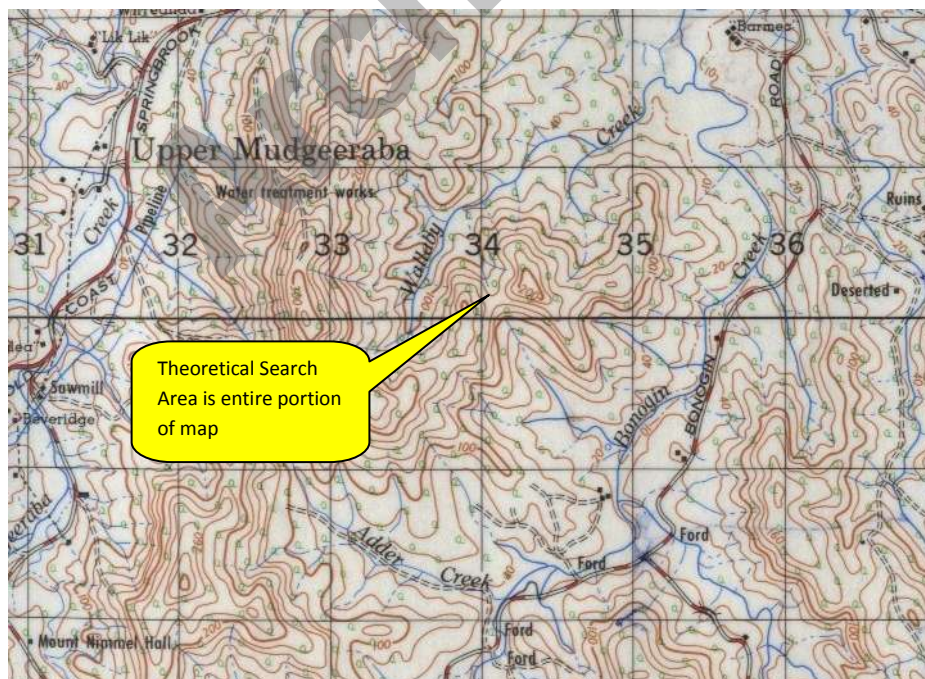
Probable search area identified.

4.123. The most probable search area for the MP is now a small area between the river and the ridge, as shown in green above. Planning can now go ahead to commence a SAR mission.

Scenario 2:



4.124. A bushwalker has been report missing in the Gold Coast Hinterland. She was last seen in the above saddle at 1200hrs after which she became separated from her group. It is now 1500hrs, with three hours having elapsed.

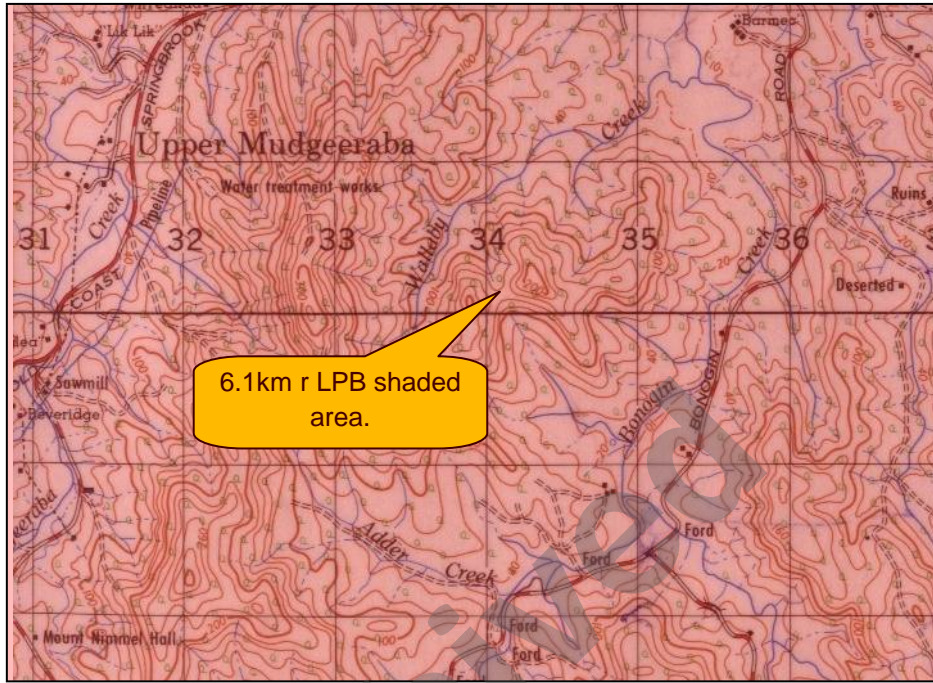


Theoretical area is entire map portion.

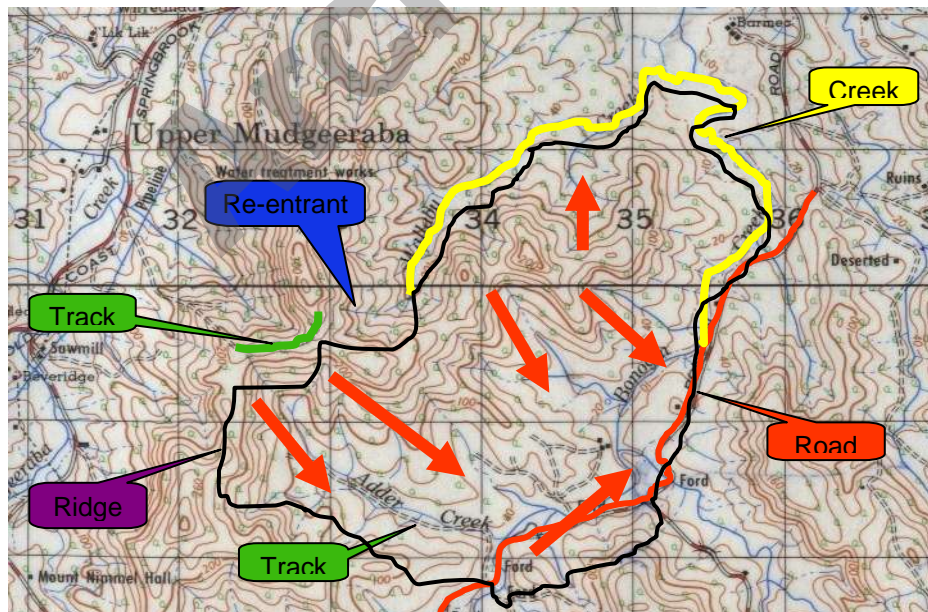
4.125. A look at the map shows that the terrain is moderate sloping hills and has open sclerophyll vegetation. Naismith's Rule suggests that a person can walk at 3kph in light wooded terrain, but again does not take into account age or fitness. The MP has been missing for 3 hours

and at 3kph, this gives a circle with a radius of 9km. This area covers the entire area of the above map.

- 4.126.** Statistically, the lost person behaviour for hikers shows that 80% are normally located within 6.1km of LKP. After drawing a circle of 6.1km radius from LKP it can be seen that it still covers the entire section of the above map. In the above instance this has not tightened the search area by much.



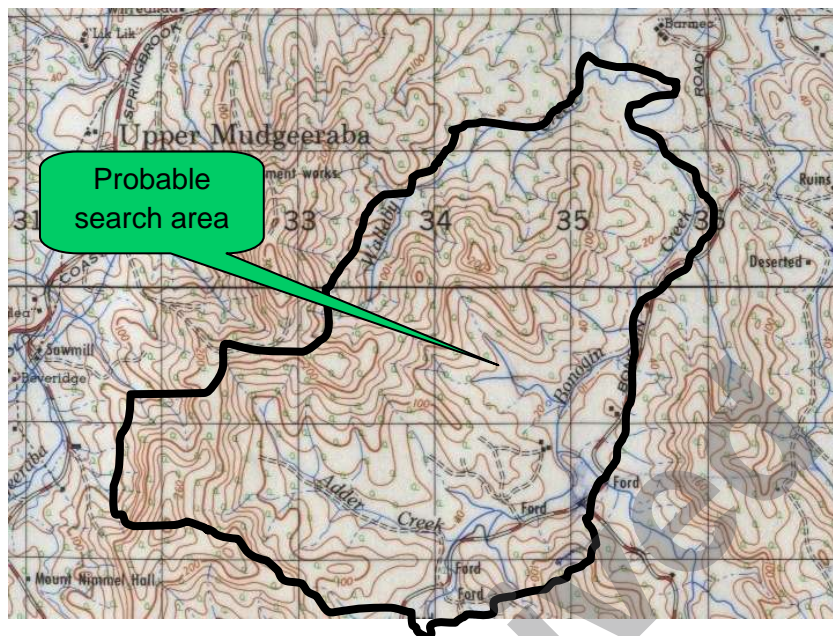
Statistical area is also entire portion of map.



Subjective features plotted.

- 4.127.** Looking subjectively at the map a number of natural and man made boundaries can be identified, including the road, creek, ridge line, re-entrant and tracks. Marking these will reveal an irregular shaped search area, shown in green above. An inspection of the terrain has also identified that from the LKP the land slopes downward towards the creeks on both

sides of the ridge. An assumption could be made that a missing person would walk downhill towards a watercourse and then follow it to help. An equally valid assumption could be that a missing person would seek higher ground to attempt to identify their location. Which course the missing person will take will depend on their experience, ability to navigate, mental state and fitness. Intelligence gathered during pre and ex comms may shed light on this assumption. In either instance the area contained within the identified boundaries would be the area of highest probability.



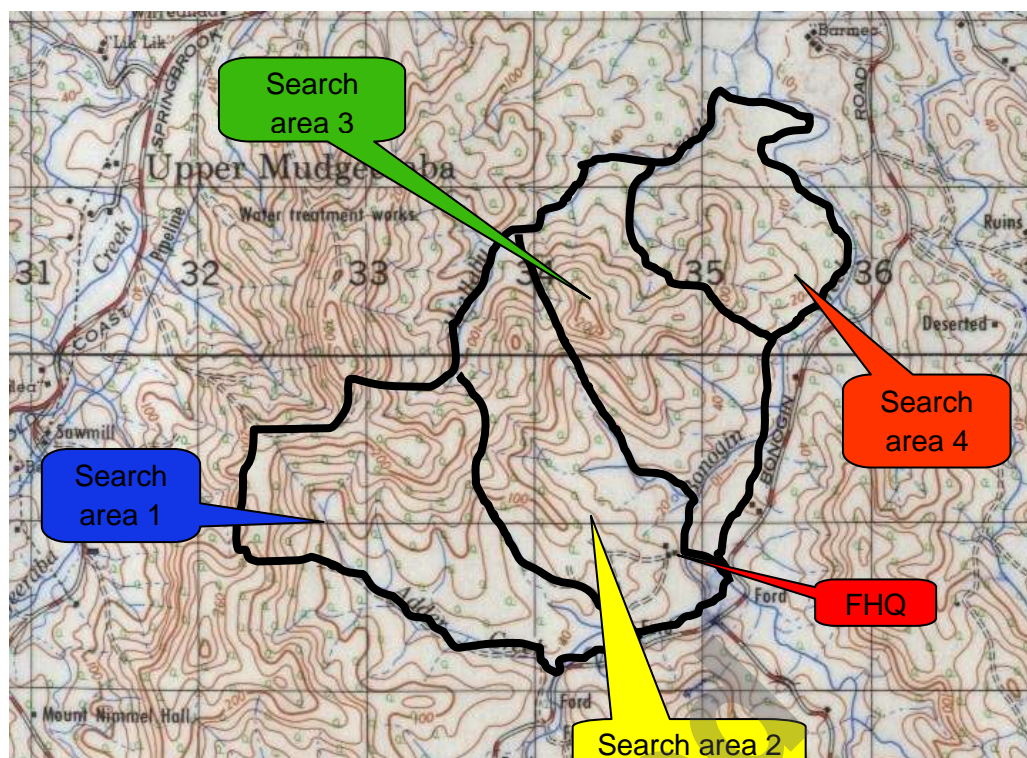
Probable search area plotted.

4.128. Search Area Segmentation: It is now essential that the search area be segmented into task areas. These should be small enough for efficient coverage by a team in a reasonable time. Where segmentation results in more task areas than teams, it is necessary to prioritise the task areas. Where specialist skills are required to search an area, eg, mine shafts, sink holes or cliffs, these should be treated as specific task areas. Segmentation into task areas on a map may not easily translate into identifiable blocks on the ground. It may be necessary to modify task areas to suit the ground conditions. The boundaries of task areas should be readily-identifiable features such as:

- a. natural features (eg, rivers, creeks, ridges, re-entrants, spurs, tree and grass lines, and shorelines); and
- b. artificial features (eg, roads, tracks, power lines, water pipelines, fences, railway lines etc).

4.129. Where readily-identifiable features are not available as task boundaries, use may be made of global positioning systems (GPS), compass bearings or markers.

4.130. In some environments there will be no natural barriers within your possible search area. This often occurs in the inland areas of all states except Tasmania, where there are large tracts of open plains with no watercourses, hills or other obstacles, but can also happen in large rainforest areas or sclerophyll forests. In these cases it is not possible to reduce the search area by these means and it is necessary to look elsewhere for clues and assistance.



Search area divided into smaller searchable areas.

- 4.131.** The intention of the MP can be a pointer to possible directions of travel. The fall of the land may suggest natural funnels, which will draw a missing person. Lost and tired persons tend to walk down hill, following the path of least resistance where possible. Cattle and animal tracks will often be followed by lost persons.
- 4.132. Special Searches – Abductions/Homicides:** Overseas and Australian studies have revealed that approximately 1 of every 10 000 children reported missing are the victims of an abduction/homicide. The SMC must be aware of this as his/her search may eventually be running parallel with a criminal investigation. Time in both cases is crucial as studies show that approximately 44% of victims have been killed with one hour of being abducted and 91% within 24 hours of being taken.
- 4.133. Reporting of Missing Children:** The below table is an indication of the time frames between the child being noticed missing the when it is reported to authorities. (US Data 2003)

When reported	% of cases
Immediately	19%
Within 1hr	25%
Within 2hrs	40%
Within 4.5hrs	68%
Within 24hrs	86%
> 24hrs	99%

- 4.134. Guidelines:** The following are suggested guidelines to be considered in line with normal SAR procedures:
- Rule out that the child is lost or missing for other reasons.
 - Rule out that the child has been taken by a parent from a custody dispute.
 - Secure the child's residence.

- d. 74% of children abducted are killed within the first 3 hours. Action must be taken immediately in a suspected abduction.
- e. Extensive canvass of immediate area to locate and identify 'unknowing' witnesses, people who have seen something but are unaware of its significance.

4.135. Distance relationships:

- a. In 80% of instances of abduction the child was taken less than 500m from their LKP.
- b. In 47% of instances the murder scene was less than 500m from the abduction location.
- c. The site of the initial contact between the child and offender is the location with the greatest chance of having a witness.
- d. In 72% of instances the body location site was less than 60m from the murder scene. (US Data 2003)

Distance from Initial contact site to Murder Site	
Distance	Percentage
60m	31%
400m	47%
2.4km	57%
19km	82%

US Data 2003

- e. In 49% of instances the body recovery site was deliberately selected prior to event. 63% were greater than 2.4km from the victim's home. (CATCHEM UK Data 2003)

Distance body located from point of last sighting.	
Distance	Percentage
Within 800m	91%
Between 800m and 1.6km	6%
Over 1.6km	3%

CATCHEM UK Data 2003

Deposition of body outdoors. No vehicle or transport used.	
Proximity of footpaths to Body Site	
0-45m	98%
45-91m	2%
Distance Body Found from place last seen.	
Within 800m	91%
800m – 1.6km	6%
Over 1.6km	3%

CATCHEM UK Data 2003

Deposition of Body- Vehicle or transport used.	
Proximity of road/tracks affording vehicular access.	
0-45m	80%
45-91m	9%
91-136m	3%
Outdoors	94%
Within premises	6%

CATCHEM UK Data 2003

4.136. Where to look: Local knowledge of the area is essential. Locations to look in are:

- a. Vehicle rest areas and parking bays
- b. Debris piles.
- c. Dead end roads off main highways
- d. Overgrowth filled gullies or canyons
- e. Vacant allotments/ acreages
- f. Dumping sites
- g. Parks or natural areas
- h. Creeks, rivers or irrigation channels that are overgrown.

4.137. Mass Casualty SAR Incidents: Causal factors: Throughout the world man made or natural disasters regularly overwhelm small communities with the resulting loss of live and missing persons. These causal factors include:

- i. **Mud slides:** 'A mass of mud and other earthy material that is falling or has fallen down a hillside or other slope.' Mudslides are very common in the wetter parts of the world, northern South America, central Africa and south-east Asia as a result of large amounts of localised rain which causes a portion of surrounding hills to shift downwards, wiping out small villages and destroying communities. Statistical evidence suggests that most people caught in the mudslide will either self recover and make it to safe ground or they will not. There is very little evidence that people survive for any length of time in mudslides. Missing persons swept up in the mud will be taken some distance from where they began, possibly being pushed to the side of the mud flow or buried deep within the flow.
- ii. **Tsunamis:** A long sea wave caused by an earthquake or other underwater disturbance. Tsunamis are more common in the Pacific Ocean, primarily because this ocean is surrounded by moving tectonic plates. While not common, tsunamis are not all that rare and occur on a semi regular basis with little effect on the surrounding countries due to the distances involved and depth of the ocean. In recent times they have involved several waves or walls of water surging inshore for distances up to ten and twelve kilometres depending on the topography of the ground. The waves or wall of water may be only a few centimetres up to four and five metres in height. The water gathers up all loose items in the way, and it is these that often cause the damage to structures and persons. The initial force of the water and the amount of debris are what prove fatal to people caught in the first or subsequent waves. Similar to mud, people swept up in the tsunami will often be taken some distance from where they first entered the water. These people may be deposited far inland or carried back out to sea as the wave recedes. In both instances survival would depend on their ability to get out of the way of the water. Once trapped in the water chances of survival quickly fall.
- iii. **Flash flooding:** A sudden local flood of great volume and short duration. Flash flooding is different to general flooding in which the community normally has some

prior knowledge. Flash flooding can occur as a result of a sudden downpour of rain in a localised area or as a result of heavy rainfall in another location flooding into a second area. There is generally little prior knowledge or warning of a flash flood. General information suggests that those persons trapped in the flood waters have a limited chance of survival unless they manage to extricate themselves within the first few minutes. The longer the period trapped in the water, the less likely they will survive due to the buffeting and collision with water borne debris and other obstacles including vehicles, trees and ground fixtures.

- iv. **Bush fires:** A fire that occurs in the bush, started by lightning, burnoff or deliberately. Australia is plagued by bushfires, particularly during the hotter months of the year. They can be limited to a single property or cover vast tracts of land driven by favourable winds. There is no large scale effective countermeasure against bushfires except burning off the ground fuel before the fire front. Official advice for those facing a bushfire is to either leave the area or stay and defend their properties. Information and investigation into bushfires suggests that those persons that are caught and perish in the flames do so in situ and are not carried away as in floods.
 - v. **Earthquakes:** A sudden and violent shaking of the ground, sometimes causing great destruction. They are usually caused as a result of movement within the earth's crust. Australia is situated approximately in the centre of our tectonic plate and is therefore spared major earthquakes, although as a nation we do suffer from smaller earth movements, which are not as severe as many other countries.
 - vi. **Avalanche:** An avalanche is a sudden rapid flow of snow down a slope, occurring when either natural triggers or human activity causes a critical escalating transition from the slow equilibrium evolution of the snow pack. Typically occurring in mountainous terrain, an avalanche can mix air and water with the descending snow. Powerful avalanches have the capability to entrain ice, rocks, trees, and other material on the slope. In contrast to other natural events which can cause disasters, avalanches are not rare or random events and are endemic to any mountain range that accumulates a standing snow pack.
 - vi. **Subsidence:** The gradual or swift caving in or sinking of an area of land. This is becoming a more common feature in areas where developments have been built over old coal mines.
- 4.138. **USAR:** Urban search and rescue is the search for and recovery of survivors and deceased persons trapped within or under the rubble of collapsed buildings, tunnels or other structures. This type of search is generally the province of the Fire Service within each State/Territory and as such will not be touched upon in this section. SMC's should bear in mind that these searches will often go hand in hand with normal SAR incidents.
- 4.139. **Coordination:** It is imperative that a search and rescue mission be commenced at the earliest opportunity in order that any survivors are given the maximum chance of being located and recovered safely. At the time it is determined that persons are missing as a result of a disaster a senior SAR Coordinator should be advised and called into the MIR or Operations Room. This Coordinator will be responsible for initially assembling a team, recommended five SAR trained member minimum, to travel to the disaster area. While there are normally SAR trained members spread throughout each State the major source of experienced members would be the Search and rescue Units/Water Police in the short term. These members can be deployed immediately and should be rotated and/or replaced on a roster system in conjunction with the Senior SAR Coordinator and other units. Where required an Overarching SAR Supervisor should be appointed to provide advice, guidance and support in situations where more than one search location is required.
- 4.140. **Initial actions:** The incidents described above can occur without any warning or with minimal warning. The science of disaster prediction is still in its infancy and authorities are

always caught between issuing warnings too early and panicking the community or issuing warnings too late and not allowing the community to take proper preparations. In many instances the trigger points for the issuing of warnings are very close to the actual occurrence of the event.

- i. **Extent of the incident:** The SMC should endeavour to determine the extent of the incident. In many of the above disasters the actual area of destruction will be limited to a relatively small area. Flooding and bushfires have the potential to cover large areas.
- ii. **Population details prior to incident:** In order to determine the number of missing persons within a particular area the SMC will need to obtain information as to the original population in that area. This is inherently difficult as many families and persons are displaced from their homes and are either placed in shelters in other locations or with friends and relatives. In the first instance the number of missing persons will always be high until detailed lists of survivors can be compiled by agencies such as Police, Community Services and the Salvation Army. Although this information is vital in the planning for a SAR incident, don't postpone the commencement of the SAR because this information is not immediately forthcoming.
- iii. **Last known location of the MP's:** Where possible information of the last known point of each missing person should be obtained as a starting place for the planning of the SAR response. Again this is very similar to the problem above in that this information may not be forthcoming until several days into the operation.
- iv. **Lost Person Behaviour:** There is no LPB that details the post distress actions of persons caught up in the above disasters. Given sufficient warning for some of the disaster types, such as bushfires, persons have the choice of either fleeing the area for a safer location or staying and fighting. The actions of the other disaster types are so difficult to predict that general advice is to evacuate the area. For those persons that remain behind and are caught up in the incident it is extremely difficult to predict where will be the best locations to commence a search.

4.141. Working under or within a MIR: A MIR and/or PFCP will be set up in conjunction with a Local Government Disaster Centre. The State Disaster Coordination Centre may also be activated if the initial incident warranted. The SAR component of the incident is but one small role within a wider response and recovery operation. The most senior member assigned to the incident will be the Incident Commander and will therefore set the tone of the response and recovery. The SAR system fits underneath but is separate to the MIR. Whilst he/she must follow the directions of the Incident Commander, the SMC is the member running the SAR response. The SMC will be competing with other units and agencies for the limited resources available initially at any disaster incident. The SES required to conduct searches will also be required to assist in disaster centres, other activities and generally assisting the surviving population. Other assets such as helicopters, four wheel drive vehicles, boats, heavy machinery and ADF resources will be competed for. The SMC should prepare a detailed search plan, outlining the objectives and equipment/resources required to conduct the search phase.

4.142. MIR Liaison Officer: The SMC should consider, at the earliest opportunity, in having a Liaison officer appointed between the MIR and the SMC. This member would work from within the MIR and be in a position to pass on details that would be useful in a SAR incident that may otherwise not be forwarded. These details will include information obtained from a variety of sources such as detectives, traffic, SES, Local Government. The type of information useful in a SAR incident will include:

- i. Last known location of missing persons
- ii. Clothing worn when last seen

- iii. Statements from people last seeing MP's.
- iv. Other people with MP's
- v. Other sightings of MP's

4.143. Field Search Headquarters: The location of the FSH is normally determined by the SMC.

- a. Where possible it should be in or very near the search area. This is to limit time travel, to allow the SMC to have very good situational awareness and allow ground to map accuracy. As the area will have recently suffered destruction there may not be the normal facilities found at most FSH's. The SMC will need to source communications, tents, power, tables, maps etc (local SES can assist). The ADF can also assist if a DACC request is made. The FSH needs to be secured and away from the public eye. Access should be limited to necessary SAR personnel. A briefing area should be set up adjacent to the FSH, close to an assembly area. Welfare, toilets, food, communications and stores will be within the immediate area.
- b. Each distinct search location should have a separate SMC to coordinate the SAR response. If there are two or more distinct search locations then a senior SMC will need to be appointed to provide an overarching supervisory and coordinating role.
- c. Each SMC should be provided with a team of four SAR trained members:
 - i. **A/SMC:** This member will provide day to day assistance to the SMC. They will be responsible for putting into action the SMC's plans and for providing an alternate opinion during the plan development stage to ensure that all contingencies are being covered.
 - ii. **Planner:** This member will be responsible for determining the search areas, plotting these onto the map on a daily basis or otherwise as determined by the SMC. They are also responsible for the allocation of the search teams and completion of all area, speed, distance and time calculations in order to provide advice to the SMC. This member will also manage the task sheet distribution and collection.
 - iii. **Intelligence:** This member will be responsible to the SMC for the collection, collation, evaluation and dissemination of all information arriving at the FSH. They will filter and value add to any information obtained, check it against current and past tasks and where necessary forward the information to the Planner for assigning. This member will also manage the white board at FSH.
 - iv. **Administration and Logistics:** This member, working in conjunction with the A/SMC, Planner and Intelligence will source the necessary resources to enable the search to proceed. They will also be responsible for re-supply of teams, rest and rotation of teams, food, welfare, fuel, travel arrangements and any other task assigned by the SMC.
- d. On a protracted search it would be necessary to rotate the entire FSH staff on a five day basis. The Senior SAR Coordinator will be responsible for organising fresh teams to rotate through each FSH. On the morning of day five the new team will arrive at the FSH, with each fresh member pairing off with the member they are replacing. Past experience suggests that a four hour handover will provide all the necessary information, thought processes, plans and current tasks to the oncoming team. The original team can then depart for their home stations for rest and relaxation.
- e. A five member FSH will provide a professional response to a delicate and sensitive situation. It will also provide the Incident Commander with the best possible chance of achieving a reasonable outcome.

4.144. Search strategies: There are a number of steps to follow to ensure that the best possible search is conducted within the area of the disaster. In most instances the SMC will be looking for deceased persons, more than likely hidden in the debris left behind after the incident.

- i. **First search:** Once the area of destruction has been identified and the initial danger has passed the first search can commence. The aim of the first search is to clear all buildings, houses, shops, sheds, barns, vehicles and other potential places of entrapment. The first search will be similar to a fast search, the aim of which is to ensure that all survivors are located and removed to a place of assistance. While the best medical advice suggests that there would be very few survivors in most of the disaster types there are numerous instances where a survivor has been located days after the initial incident, often protected by the very debris that proves fatal for most persons. Local SOP's will deal with the actions to be taken in this event.
- ii. **Second Search:** The second search is a more thorough search of the areas covered by the first search and any other areas identified as requiring searching. This search is more akin to a general search in which the searchers are going to make a more thorough search of each of the buildings and surrounding countryside within each search area. This search will require a large number of searchers to ensure an adequate coverage of the search area. In those areas inundated with mud, flash flooding, tsunamis, earthquake and subsidence there will be large amounts of debris piled up against any solid walls or barriers in the destruction area. These debris fields will need to be thoroughly searched, to the extent that these debris walls will need to be pulled apart and sifted through. In many instances the mud will eventually set as hard as concrete and will require heavy machinery to dismantle. During this stage it is very important that searchers sift through the debris as it is pulled apart to ensure that deceased persons are located.
- iii. **Third Search:** If necessary a third search may be conducted of all or a part of the search area. This may be required due to weather or other circumstances that may have degraded earlier searches. Unusual odours or debris piles not previously dismantled will need clearing before an area can be identified as clear.
- iv. **Fourth and subsequent Search:** A fourth and subsequent searches may need to be carried out in some areas of the search location due to a variety of factors including:
 - a. Area still inundated with water
 - b. Conditions are not conducive to conducting a thorough search
 - c. Current conditions are considered unsafe, particularly where buildings are concerned.
 - d. Continued ground tremors
 - e. Continuing rain
 - f. Insufficient resources, necessity for specialist crews, to complete search.

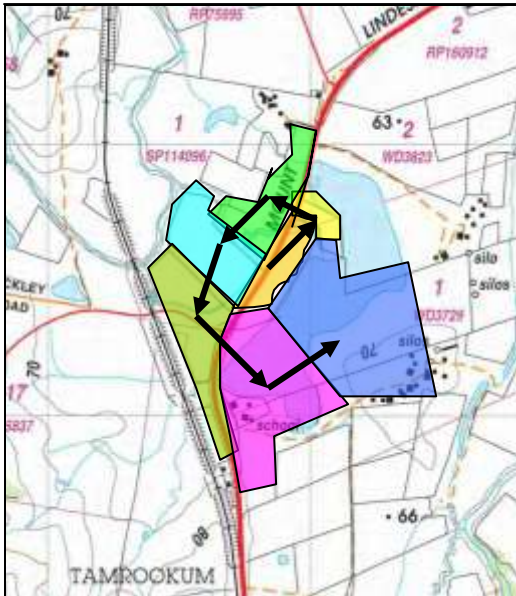
4.145. Search problems: Unlike general SAR operations, searching in mass victim incidents will require different techniques. There are a number of different situations that will need to be taken into account by the SMC:

- i. **Shops, houses, flats and apartments:** A full search will need to be conducted of the interior of all houses, flats and apartments that were affected by the incident. This search should include all rooms, cupboards, wardrobes, hutches, fridges, washing machines, etc. Underneath all buildings will also need to be cleared. Those buildings on stumps may not pose the problem of those buildings closer to the ground. Flood water and mud can carry persons into and under buildings where they may become trapped. **(Before doing so, ensure buildings are determined structurally sound.)**
- ii. **Open areas, paddocks, parks and farmland:** As a result of flooding and/or mud these open areas can be covered in either water, mud or a combination of both.

Searching these areas is man power extensive and time consuming. They must be covered slowly, with a visual horizon as close as 2m, and a slow walking pace. Long metal poles will also assist in testing the mud for buried persons. A searcher will notice the difference as they push a metal pole through the mud and into a deceased person. Searchers should also beware that there will be cattle, sheep and wildlife buried within the mud that will produce a similar smell and feel to a deceased person.

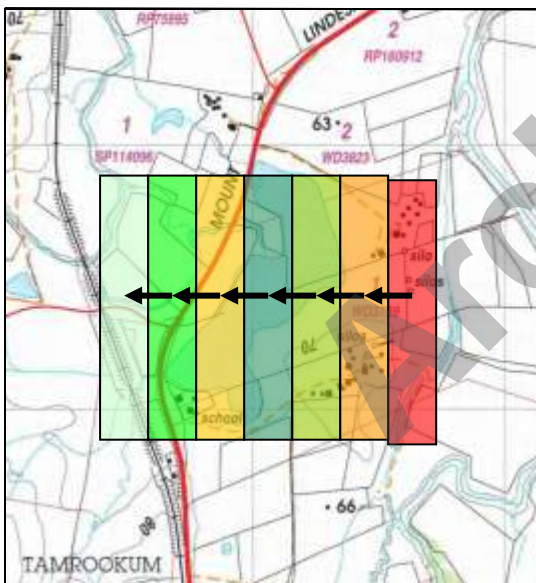
- iii. **Creeks, waterways, gullies, drains etc:** Flooding water and mud will generally take the path of least resistance, which normally will be creeks, gullies, waterways and drains. The depth of water in these may require specialist Units to assist in searching, such as Divers. The force of the water and mud will also push motor vehicles, household items and other debris into these waterways. Each one of these items will need to be located and recovered from the water in order that they can be cleared as empty. Animals such as horses, cattle and wildlife will also be found in the water. As they could be masking human remains they will also need to be recovered and checked.
- iv. **Mountainous areas:** Mountainous areas pose a wide variety of problems for a SMC, in particular the necessity for searchers to have specialist skills in mountain climbing and/or snow searching. Avalanche victims have a very limited golden period requiring searchers to be deployed within minutes of the incident occurring. Transport to the incident site may be limited due to road and rail closures. Rotary wing assets will be the best option.
- v. **Fatigue:** Although the search areas used in these situations will be smaller than in general SAR operations the intensive searching required will cause the searchers to succumb to fatigue quicker than usual. Searching areas while wading through water and mud will also impact on the physical ability of searchers, limiting their useful capability and requiring regular rest and rotation.

4.146. Search area delineation: As in normal SAR operations the overall search area should be divided into sub search areas that are capable of being identified and then searched. The use of natural or man made barriers or boundaries will ensure that each search area can be properly identified by its respective search team. The SMC has a range of options in which to delineate the search area depending upon the severity of the event. Depending on the number of volunteers available each team should be assigned an area no larger than a normal town block per task. This will provide sufficient work for a four hour period. If teams are working in open fields an area of approximately $\frac{1}{2}$ km² would be sufficient per four hour period. An expanding square or circular search from the point of origin or centre of the disaster will ensure that all areas are covered. A creeping line search from one side of the search area to the other will also achieve the same result. The ultimate aim is to ensure that all areas within each search area are covered.



The search can radiate from the central point of the disaster similar to an expanding square search. This search will require good access to the epicentre and good control over the search teams to ensure that they do not leave gaps in the search. This can be done with small numbers of searchers in the initial phases but as the area gets larger more resources will be required.

Expanding Square Search.



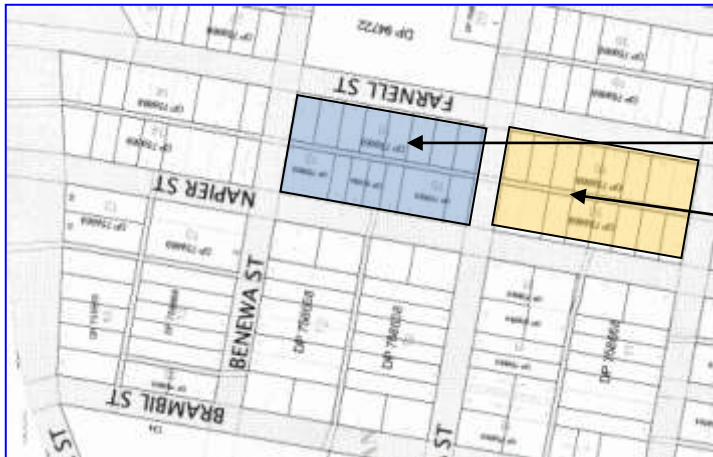
The search can also commence from one side of the incident location and sweep across the entire area in a creeping line fashion. This will be very resource intensive and will possibly leave the worst hit areas of the location until half way through the search but may be useful if access to the worst hit areas is not possible in the short term. This search can go in any direction depending upon the terrain and the incident path.

Creeping Line Search

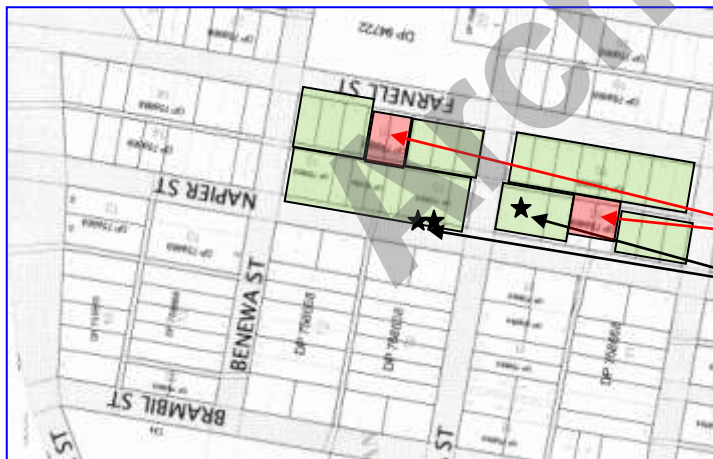
Obtaining plans from the local government of the area of the disaster will give the SMC an appreciation of the number and location of all houses, shops and other buildings within the search area. Depending upon the time of year and location there may also be considerations of children in school, shopping malls full of shoppers or popular holiday destinations packed with weekend campers.

Utilising the urban property plan below the SMC can allocate a block to each SES or other team for searching. The briefing would be able to include the number of properties within

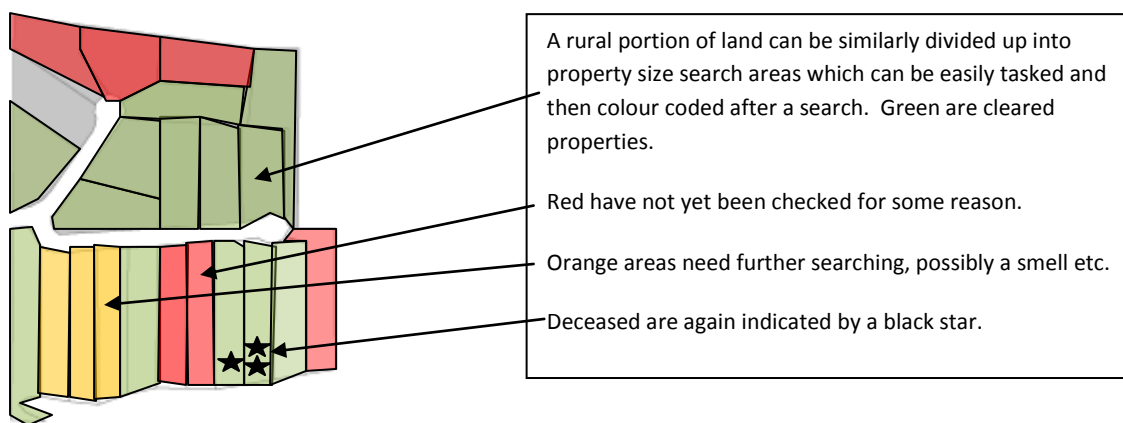
the search area and the type of buildings likely to be encountered. As each property is checked for survivors, deceased or other it can be marked accordingly. Those properties that cannot be searched for a particular reason (Unable to reach location, building structurally unsound etc) can then be easily be identified at a later stage for further investigation



Each search area is coloured a different colour for each search team. Blue Team has 15 Properties to search in their block while the Orange Team has 14. The size of the blocks and number of individual properties will provide the SMC with an indication of the times involved.



Upon return by the teams the master plan can be marked indicating what has happened. Both teams managed to search all their blocks apart from two properties each, marked in red. The black stars mark where deceased persons were located. The red properties will need to be search at a later time and



4.147. Tasking sheets: Tasking sheets have been developed to ensure that all of the identified tasks within the search are properly undertaken and completed. The SMC should ensure that each task is recorded in duplicate at least, providing one to the search team leader and keeping one at the FSH as reference. As the task is completed the original can be signed off and filed. At the conclusion of each day any uncompleted tasks can be identified and reassigned if necessary. The task sheets will enable the SMC to provide a detailed summary of the searching on a daily basis. Electronic mapping programs allow easy input of search areas as they are completed, again providing the SMC with an easily readable summary of the daily activities. They will also form the basis of a Coronial File, which will always follow a major disaster with loss of life.

4.148. Briefings: Briefings to search teams and search team leaders are generally given in the SMEAC format.

- i. **Situation:** The situation will be a precise of the incident occurrence and subsequent events.
- ii. **Mission:** The mission should be a short statement of intent. Ie. To locate missing persons in the search area.
- iii. **Execution:** The execution section will be the most important part of the briefing as it will provide the search teams with the tools to perform their assigned tasks. Each situation will be different and the methods of searching will be dependent on the terrain, disaster type, number of volunteers, weather and time frames.

Execution Factors:

1. **Deceased persons:** Deceased persons meet their demise in many different ways. Bushfire victims may vary from no visible signs of burning to totally incinerated with no resemblance to a human. The degree of destruction depends on the severity of the fire, location of person, speed of the fire and any actions the victim may have made to protect themselves. Many bushfire victims succumb to asphyxiation as the fire consumes all the oxygen in the area. Others will breathe in the superheated air and perish as a result of the complications of the internal burning. Searchers must be made aware that their targets will range from an intact human to a small pile of dark ash. Flood and mudslide victims will normally retain their human shape, although due to the force of the water/mud it may be distorted and out of shape with broken bones and internal injuries. These victims will not often be found on the surface. They may be entombed within a metre or more of mud or mud and debris. The deceased may not be easily recognised as they are often coated with mud and blend into the background. Those that are left uncovered after the waters recede will

often discolour and darker quickly as decay and sunburn sets in. Victims from building collapse as a result of earthquake or subsidence are often distorted and misshapen due to the extreme weight suddenly falling on them.

2. Searching for deceased is a combination of all senses as sight alone will not be enough. The distinctive smell of decaying flesh may greet the searcher as they near a potential area. Keeping an eye on the shape of the ground may unearth a buried victim. Observing an area of darker ash in a human shape may identify a victim. Searchers may also use thin metal poles to prod into the ground, the change of pressure or sudden change of odour may suggest the location of a body underneath. Thermal imaging cameras and ground radar can be used if available. There is no record of any success to date. Cadaver dogs may also be considered, although they work best when the deceased are about week old.
 3. Location of deceased: Local SOP's will determine the actions on location of deceased persons. These should be included in the briefing to ensure photographs and examinations are made prior to recovery in case of foul play. The location should be recorded by GPS or other accurate means to enable it to be plotted for the final report. Depending on the incident, a large number of animals will be located and will require the services of a doctor or forensic member to determine if they are human or otherwise.
- iv. **Administration and Logistics:** Re-supply, body bags, disinfectant, insect repellent, sun screen, fatigue, meals, water, transport, PPE are some of the items needed to be covered in this section.
 - v. **Command and Communications:** This section is common for all SAR incidents.
- 4.149. **Record Keeping:** As per all SAR incidents, detailed recorded must be kept for future reference. The will include:
- i. **SAR Log:** A detailed chronological record of decisions and actions taken during the SAR incident. With respect to disaster searches, all decisions with respect to deployments, asset allocation, briefings, debriefings should be recorded. The log will also include such details as daily sunrise and sunset, weather conditions, topographic hazards, SAR teams and hand over notes.
 - ii. **Task sheets:** Should be completed in duplicate, original for the search team and duplicate for the FSH. The original sheets should be collected from the search teams as they return to FSH. If the task has been completed it can be closed. If the search team was unable to complete the task for whatever reason, the task can be reassigned at a later date.
 - iii. **Map overlays:** Depending on the size of the search area and the number of search teams there may be a map overlay for morning and afternoon or for a single day. Each overlay should have the map number, date, time and SMC name in the top right corner. The top left and bottom right should have two reference marks so that the overlay can be aligned with the map at a later date. The actual areas designated and those searched can then be drawn in permanent marker on the overlay. As the SAR develops successive overlays can be placed on top of each other to determine what areas have been missed and what need to be researched.
 - iv. **Radio log:** This log will normally be maintained by the SES and will be a complete record of all radio traffic to and from FSH for the duration of the SAR operation.
 - v. **Briefing notes:** A written copy of each daily briefing should be filed for future reference.
- 4.150. **Electronic recording of search:** There are a number of electronic aids that can greatly assist the SMC in recording information and briefing up and down the chain of command. One of

the biggest problems associated with SAR is the accurate identification of areas searched. At present this is done through a combination of map work and GPS usage. Where available GPS data can be downloaded onto a mapping program to give an accurate picture of where search teams went. This enables the SMC to know if the briefings were sufficient and if the directions were followed. Other electronic devices such as ArcPad's or similar instruments have the ability to provide mobile field mapping and data collection. This information can then be sent via the mobile telephone system to a server for instant production on a FSH computer terminal. Used in conjunction with a GPS and date stamp enabled digital camera, pictures can be taken of any object of interest and transmitted instantaneously to the FSH. This has the ability to allow the SMC to observe victims insitu, debris mounts and other points of interest while communicating with the search team. These photos can then be saved against that location for future reference.

This information instantly allows the SMC to identify each property as it is being searched, and what the property looks like in real time. The Incident Commander could also view these details from their office without the need to visit the scene. These electronic aides could also provide information to assist the Coroner during any subsequent inquest as any of the properties involved in the incident can be viewed, as can the initial location of motor vehicles, persons and buildings if necessary.

4.151.Summary: It is important to consider all the factors described in this chapter, along with information obtained about the missing person(s) prior to planning the search.

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Chapter Five - Search Techniques and Operations (Land)

- 5.01.** Police authorities undertake the responsibility for coordination of land search and rescue.
- 5.02.** The previous chapter described how to determine the area where available search efforts should be deployed. Once this area has been determined, a systematic search for the target should be planned. Prior to a search operation commencing, the search planner should provide a detailed search action plan to all involved, specifying when, where and how individual search assets are to conduct their operations. Coordination instructions, communications frequency assignments, reporting requirements, and any other details required for the safe, efficient and effective conduct of the search must also be included in the search action plan.
- 5.03.** The selection by the SMC of available SAR units to be used in SAR operations should take into account the following considerations:
- a. the need to reach the distress scene quickly; and
 - b. suitability for at least one of the following operations:
 - i. provision of assistance to prevent or lessen the severity of accidents;
 - ii. conduct of a search, primarily by air but with the assistance of marine or land units as required;
 - iii. carriage of supplies to the scene of an accident and, if necessary, delivery of supplies; or
 - iv. execution of a rescue, (by marine and land units or by helicopters; and as required fixed wing aircraft to provide guidance to units or to relay communications).
- 5.04.** In coordinating a land search, the SMC, as guided by local procedures, will activate land, marine or air assets depending upon the situation. *RCC* can assist with advice on suitable aircraft for SAR operations.
- 5.05. Land Assets:** The SES or equivalent in each State or Territory will provide trained and disciplined teams of volunteer search personnel. The training will vary depending on:
- a. the location of the SES Unit,
 - b. type of terrain likely to be encountered by members of that unit (ie Victorian SES would have a snow capability while western Queensland and Western Australian Units would have a desert capability),
 - c. number of staff available for training
 - d. support provided by individual State and local governments, and
 - e. necessity of the units for SAR incidents.
- 5.06.** With respect to SAR, SES members are trained in the following:
- a. basic land search techniques,
 - b. Radio operation
 - c. Log taking
 - d. First aid
 - e. Crime or suspicious scene preservation
 - f. Vertical rescue
 - g. Logistics
 - h. Planning
 - i. Flood boat operations
- 5.07.** Search by land facilities alone is usually impractical for large search areas but it can be conducted in most weather conditions and can provide complete coverage of a confined

- area that cannot be thoroughly searched from the air. Land parties are also critical in operations where the search is carried out from the air and rescue by land facilities.
- 5.08. The need for coordination between land rescue units and search aircraft should be considered, and plans should cater for the need for two-way radio communication. There may also be a need in remote areas to keep land units supplied with fuel, water and food by means of airdrops.
 - 5.09. When the survivors are located, the SMC should liaise with the police commander with a view to expediting the return of survivors to a place of safety. Consideration should be given to aircraft relay and the use of suitable motor transport: ambulances, four-wheel drive vehicles, buses, etc.
 - 5.10. Specialist police and military land parties are equipped with material useful to the SAR role. It is desirable that land SAR units be equipped with basic navigation aids, two-way communication equipment, sufficient clothing, medical supplies and rations to reduce the need for air drops and specialist equipment appropriate to the unit's particular role.
 - 5.11. **Marine Assets:** The water component of a land SAR incident might involve inland waterways, lakes, dams and coastal areas of the country.
 - 5.12. While most of the land SAR marine environment will be smooth water there are areas in Australia that have fast flowing white water, such as north Queensland and Tasmania. The SES in most states have a flood boat capability which is also available as a SAR asset. Flood boats are of shallow draft and made of metal to resist floating debris. They are capable of getting close into the banks of creeks, rivers dams and other water areas to search sections not easily visible from the land side.
 - 5.13. White water rapids will require a different approach as they are not easily navigated by the larger flood boats. Searching from smaller man powered craft or from landward may be necessary.
 - 5.14. As with aircraft, the discretion to use the boat is in the hands of the skipper. Being of shallow draft and low freeboard they are not suitable for rough conditions or surf.
 - 5.15. Local Surf Lifesaving Units may have a capability to assist in searches in or near the shoreline of beaches. In the more populated or tourist areas the Surf Life Saving Association will have water craft, suitable operators and a wealth of local knowledge.
 - 5.16. **Air Assets:** Many types of aircraft will be suitable as SAR Units with little or no modification. However, care should be taken to ensure that, even in an emergency, safety of flight is the primary consideration and should never be compromised. The normal operational and technical limitations of an aircraft, as well as the qualifications of the crew, should be carefully noted by the SMC. SMC's must ensure they are cognisant of the factors relating to the aircraft and crew that may compromise the conduct of the SAR mission.
 - 5.17. Some specialist SRU's that have undergone training from RCC are organised in Tiers and can be fixed wing aircraft or helicopters. The tiers relate to the capabilities and training of the aircraft and crews. When chartering aircraft for use as SAR Units, the SMC shall, whenever practical and effective, select aircraft from trained SAR/Emergency operators including;
 - a. Search and Rescue Units (SRU's);
 - b. Police and State Emergency Service aircraft.
 - 5.19. Advice on suitable aircraft can be obtained from RCC
 - 5.20. If additional aircraft are required, call out could be made according to the following priority bearing in mind suitability, location and availability:
 - a. domestic commercial aircraft,
 - b. Coastwatch aircraft
 - c. ADF aircraft
 - d. scheduled Regular Public Transport (RPT) aircraft.
 - e. private aircraft

- 5.21.** Private aircraft may be used when so situated as to more readily effect the saving of life, operated by crew having particularly valuable local knowledge of the area to be searched, or when no other commercial aircraft are available.
- 5.22.** As a general rule, slow aircraft or aircraft capable of reducing speed to 100 - 150 knots are most efficient for visual searches. Small and partially hidden targets are easily missed at higher speeds and faster aircraft may be subject to operational limitations making them unsuitable for low-level flights. Nevertheless, fast and/or highflying aircraft also play an important role in search operations, for instance when these aircraft carry out:
- a. an electronic (radio) search to home on distress signals; and
 - b. an exploratory sweep of a large search area simultaneously with a search by a slower aircraft flying at lower levels, a method that is particularly effective in flat and unobstructed areas.
- 5.23.** The suitability and efficiency of an aircraft for search, support and rescue operations will depend on which and how many of the following desirable features it possesses:
- a. Operational characteristics:
 - i. safe low-speed and low-level flight capability,
 - ii. short take-off and landing (STOL) capability,
 - iii. sufficient range to cover the area, with due regard to the location of redeployment bases,
 - iv. manoeuvrability, especially for searches in mountainous areas, and
 - v. payload capacity;
 - b. Equipment:
 - i. suitable navigation and instrument flying aids,
 - ii. radio equipment capable of receiving and homing on emergency radio signals, and
 - iii. adequate communications equipment;
 - c. availability of good observation posts;
 - d. suitability for the delivery of supplies, emergency equipment and personnel; and
 - e. facilities for the treatment and carriage of survivors.
- 5.24.** The SMC shall select aircraft for use as SAR Units after consideration of the following factors:
- a. type of search necessary;
 - b. type of terrain;
 - c. type of navigation involved;
 - d. need for dropping supplies;
 - e. disposition of aircraft with respect to search area;
 - f. crew experience and familiarity with the area;
 - g. weather conditions at and en route to search area; and
 - h. rescue considerations.
- 5.25.** Aircraft not equipped with radios should not be used on SAR operations except as a last resort.
- 5.26.** Fast, high flying aircraft equipped with homing and/or direction-finding equipment that have the operational flexibility to descend to low level for final search are recommended for beacon monitoring.
- 5.27.** Seaplanes and amphibians are useful for search or for carrying supplies and personnel over water. Their use as rescue units or carriers of personnel is limited to operations in lakes and river areas, or sheltered waters and bays. Under favourable weather and sea conditions, suitable seaplanes may also be used for rescue operations in protected waters, eg. large lakes, bays, shore areas etc.
- 5.28.** Helicopters are particularly useful SAR units as their slow speed and ability to hover make them suitable for search as well as rescue operations, particularly where small targets are

sought or close scrutiny of terrain is required. They also have the ability to land in a confined area and, in some instances, to operate from some vessels.

- 5.29. Some helicopters are fitted with winches or are equipped for flight in instrument meteorological conditions (IMC) and at night giving them an added advantage for search and rescue response. Turbulence, gusting winds and icing are conditions that the SMC should consider when determining helicopters as appropriate SAR units.
- 5.30. Where terrain and vegetation is such that a contour search is necessary, preference should be given to:
 - a. helicopters,
 - b. high-performance short take off and landing (STOL) aircraft, or
 - c. light, manoeuvrable twin engine aircraft.
- 5.31. Where possible, single engine aircraft should be restricted to areas where the terrain would permit forced landings.
- 5.32. When possible, consideration should be given to engaging aircraft capable of carrying at least two Observers.
- 5.33. Where possible, landing sites should be as close to the search area as possible. The landing area selected should be clear of loose articles that may be blown into the air by the rotor downwash. On beaches, it is best to use the water's edge to form one side of the landing area. Communications should be established with the aircraft before its arrival and the pilot briefed on the landing site. If the pilot is unfamiliar with the location, a description of the area using large geographical features may need to be passed. If possible, a number of people should be deployed to secure the area before the aircraft arrives so that no one enters the landing area until the rotors of the aircraft have stopped or the pilot indicates that it is safe to do so. If the landing area is in a populated area, extreme care should be taken to ensure that no children run toward the aircraft once it has landed. When communicating with the aircraft it is important to inform the pilot of any obstacles in the immediate area. This is especially applicable to wire strung between trees and power lines as these types of obstacles are difficult to see from the air and present a danger to the safe operation of the aircraft.
- 5.34. **Search Planning:** At a minimum, developing a search action plan consists of the following steps:
 - a. selecting search assets and equipment to be used.
 - b. assessing search conditions
 - c. selecting search patterns to cover the search area as closely as practicable
 - d. dividing the search area into appropriate sub-areas for assignment to individual search teams; and
 - e. planning on-scene coordination

Note: While marine search areas are calculated from well established tables, land search areas will be a combination of theoretical, statistical, subjective and deductive reasoning.
- 5.35. Before committing resources to an intensive search, an evaluation should be made of the total search effort required and the contribution that may reasonably be expected from each search unit. When assessing available search capacity, care must be taken not to over-estimate either the time that a particular search team can spend in a search area or the capability of that team to remain effective over long periods of continuous searching.
- 5.36. Failure to make a sound estimation of these factors may result in one or more of the search teams being unable to complete its allocated task and the efficiency of the entire effort being seriously compromised.
- 5.37. **Land SAR Strategies:** Although specific search plans will vary with the circumstances, a system has evolved which can apply to most situations. Land searching may be divided into four strategies:
 - a. Fast Search

- b. Reconnaissance Search
 - c. General Search
 - d. Contact Search
- 5.38.** In land search it is not necessarily go through the strategies in order, the SMC has to apply the most appropriate search strategy in order to maximize the POD.
- 5.39.** Therefore, in the initial time of a search the SMC may employ a Fast strategy, as later resources arrive, a Reconnaissance strategy may be employed. As time goes by and a person approaches their TFFS and/ or the search area expands for whatever reason, the SMC may employ a General Strategy in a high probability search segment, other teams for further Reconnaissance or Fast strategies in other segments. The fact is, all strategies can be used at the same time in different search segments. **It is a Strategy that is applied to the search, NOT a stage that the search goes through.**
- 5.40.** Often a search will progress from one predominant strategy to another. However, depending on urgency, TFFS and resources, etc, varying strategies may be employed simultaneously in differing search segments.
- 5.41.** With each of the four strategies there are associated search patterns that utilise the resources available to the best effect. Further details are provided in the search pattern section.
- 5.42.** Approximately 70-80% of missing persons are located using the fast and reconnaissance strategies, therefore these two strategies should be the first considerations of the SMC when planning for a SAR.
- 5.43. Immediate Response:** The initial search will normally consist of:
- a. A visual search along, and also parallel to, the track of the missing target. (A fast or reconnaissance search)
 - b. Actions to determine whether a signal from an emergency beacon has been detected.
 - c. Formulation of a rescue plan
 - d. Coordination with other resources and agencies as appropriate.
- 5.44.** The search may comprise:
- a. Developing a search area utilising a combination of theoretical, statistical, subjective and deductive reasoning
 - b. Developing sub-search areas
 - c. Allocating search teams
 - d. searches utilising any one or a combination of the below search patterns.
 - e. developing a rescue plan to return survivors to safety.
 - f. Gathering intelligence relevant to the search
- 5.45.** The SMC should consider:
- a. Utilising the media if appropriate
 - b. Tasking local resources where the urgency of the situation dictates.
 - c. That a search and/or rescue may be required.
 - d. The terrain, vegetation, weather, intentions of missing persons, ability of the search teams, search light available and resources available.
 - e. That the coverage factor should generally not be less than 0.5; and
 - f. The use of electronic or thermal imagery equipment.
- 5.46. Fast Search:** This method is best used when the search team arrives at the scene not long after the target has been reported missing. There is an assumption that teams are looking for a responsive target. This search provides an immediate SAR effort and requires minimal search planning to commence.
- 5.47. Fast Search techniques:** Teams are briefed to check the LKP and tracks or route intended by the target. This is normally done by lightly burdened teams of faster searchers. Track running, with regular stops for aural searching, is the standard technique. Checks of

perimeters or barriers, roads, track cutting, ridge running and obvious hazards or attractions can also be incorporated.

- 5.48. Fast Search considerations:** Teams used in this type should have some experience in clue and track detection and bush awareness. While there is a high percentage change that this type of search will locate a missing target it will also assist in defining the search area and providing information to the SMC of areas that need not be searched.
- 5.49. Reconnaissance Search:** The main reason for the reconnaissance is to carry out a quick check of specific area of probability, and also to obtain essential information about the search area, both of which have a bearing on the future search plan. Reconnaissance teams may also find the missing person or object. A reconnaissance search can be conducted using ground teams, vehicles or aircraft. A reconnaissance can be used, not only early in a search, but at any time to check on unconfirmed sightings or to re-check specific areas of probability.
- 5.50. Reconnaissance Search, Containment:** In any search, containment should be effected by cordoning the area where possible. This may through identifying physical barriers around the search area, regular patrols of roadways or tracks or the placing of physical barriers such as ropes, bon fires or vehicles across likely exit points from the search area.
- 5.51. Composition of reconnaissance teams:** Since they must travel light and fast, these teams should be kept small; ideally four persons. It is desirable that the leader or at least one member of the team have a good local knowledge of the task area and that all members are fit and capable.
- 5.52. Task of reconnaissance teams:** The area to be covered by these teams will concentrate on the area of highest probability. This area may be further limited by the existence of natural barriers such as large rivers, cliffs, etc.
- 5.53. Orders given to the reconnaissance team may include the following:**
- a. Check of all hazards which may have trapped or caused injury to the missing persons such as waterfalls, cliffs and caves.
 - b. Check tracks, huts, routes, sand-bars, waterways, waterholes, waterfalls and other likely areas for clues such as footprints, discarded items of clothing and equipment, food scrapes or wrappings.
 - c. At regular intervals call out to a missing person and listen for a reply. When vehicles are employed, the vehicle should be stopped and the engine turned off.
 - d. Interview any person found in the search area and brief them on the situation. Record their names, addresses, car registrations and other details.
 - e. Notify the Field Search Headquarters of any clue found. Do not disturb the clues, mark off the area as well as recording the time found and the name of the finder.
- 5.54. Reconnaissance Team Briefing:** The reconnaissance team must be supplied with as much relevant information as possible about the missing person. Details of clothing, footwear, equipment or items carried, all of which if discarded by the missing person, could provide vital clues. Often the importance of clues is only realised long after they have been dismissed as irrelevant.
- 5.55. General Search:** When the SMC is able to define a search area, a decision may be made to cover the area with a general search. This is a general search of the area and may be used:
- a. early in a search operation where there is a high degree of urgency; and
 - b. to reduce the search area in those situations where the search area is large.
- 5.56. Composition of teams for general search:** Teams should be kept small (4 to 6 persons) and as far as possible comprise persons of equal fitness and ability. Larger teams can be utilised depending on the terrain.
- 5.57. General Search Method:** Having determined search areas, the method of searching a particular area must then be decided. The term 'general search' does not imply an

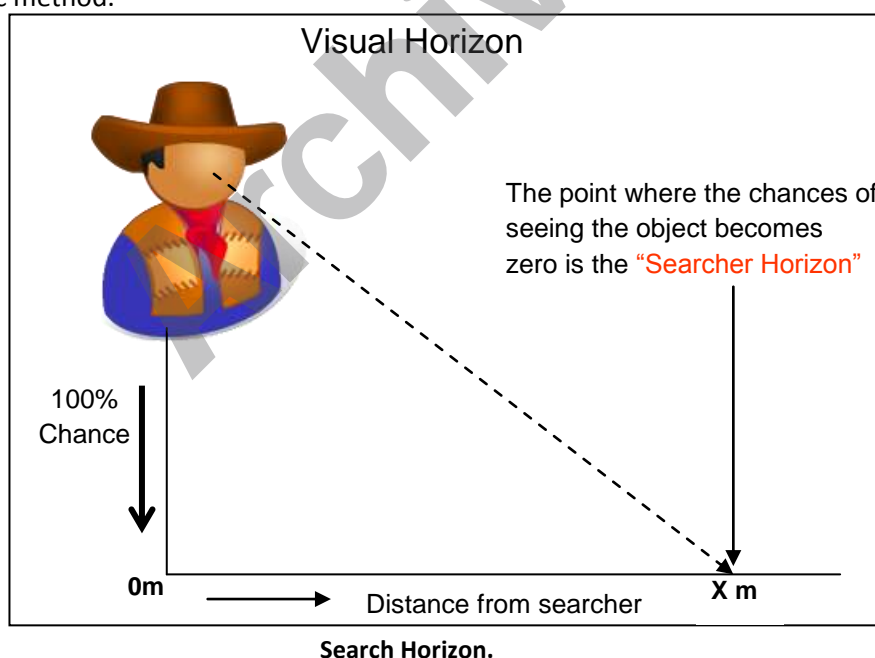
- examination of every square metre, but rather a check for signs or indications of the missing person.
- 5.58. A check of campsites and other sheltered areas, such as hollow logs or caves, may produce results. A more detailed check of any natural hazards or areas where the missing person could be trapped or injured, should be made.
 - 5.59. For areas of high probability, a modified form of general search may be employed using the same strength in the teams, but designating smaller task areas, resulting in a closer coverage of the areas involved. As for the reconnaissance search, the team should call out to a missing person at regular intervals and listen for a reply. This may need to be considered against the lost person behaviour.
 - 5.60. **Contact Search:** The contact or line search can be used to saturate an area of high probability, although it is usually the concluding stage of a search operation. A contact search involves searchers moving in a straight line through the area, evenly spaced and in sight of the adjacent searchers. The spacing will depend on the density of the vegetation and the size of the target.
 - 5.61. **Composition of Contact Search teams:** There is a practical limit on the size of a contact search team under the control of a single leader. This varies with conditions, but is normally 8 to 12 persons. The most experienced searchers should be at the ends and the centre of the search line.
 - 5.62. **Tasks of Contact Search teams:** The contact search team must search every possible refuge, since a missing person suffering in the bush is unlikely to remain in the open but will rather seek refuge in a sheltered place, out of the wind, wet or extreme heat. These will include ditches, hollow logs, amongst large rocks and under small ground scrub. All areas must be searched.
 - 5.63. **Contact Search, Special Considerations:** Searchers must look on both sides of obstacles and must continually look back as it is possible to completely by-pass an unconscious person lying behind an obstacle. A high degree of concentration is required in contact searchers, so the team leader should ensure that the searchers do not talk excessively or let their concentration lapse.
 - 5.64. The contact search line must be kept straight. This is very difficult because different sections of the line will encounter varying obstacles, eg thick scrub. Some control must operate to ensure that faster searchers in clearer areas slow down and wait for those encountering difficulties. The best method is for the Team leader to be positioned in the centre of the search line, preferably to the rear and call instructions to the flanks. An area can be covered more effectively by a series of short sweeps, rather than a single long sweep.
 - 5.65. Spacing of the line is maintained from whichever flank is following the boundary or otherwise defined track. The other flank indicates their progress by using markers. It can be an advantage to use different coloured markers on each day of the search. At the end of each sweep, the markers become a guide for the next sweep. Markers should be placed in such a manner that they can be seen easily when returning in the opposite direction. Consideration should be given to using biodegradable marker material, such as toilet or tissue paper so that it will disintegrate shortly after a search if it is not retrieved.
 - 5.66. The contact search is continued sweep by sweep until the area is covered. This is exhausting, time consuming and requires large numbers of searchers. It is important that search teams, operating in the same area, maintain contact to ensure that mutual boundaries are properly searched.
 - 5.67. **Calculated Search Area:** This is a continuation of the immediate response, where the search area is expanded to cover the probability area calculated by reference to the targets location, targets intentions, estimated speed over the terrain, search area boundaries and hazards, and the target's medical, physical and mental condition, modified by ongoing

intelligence gathering. This area may increase or decrease as further information comes to hand, which will incrementally increase the POD over the centre of the search area.

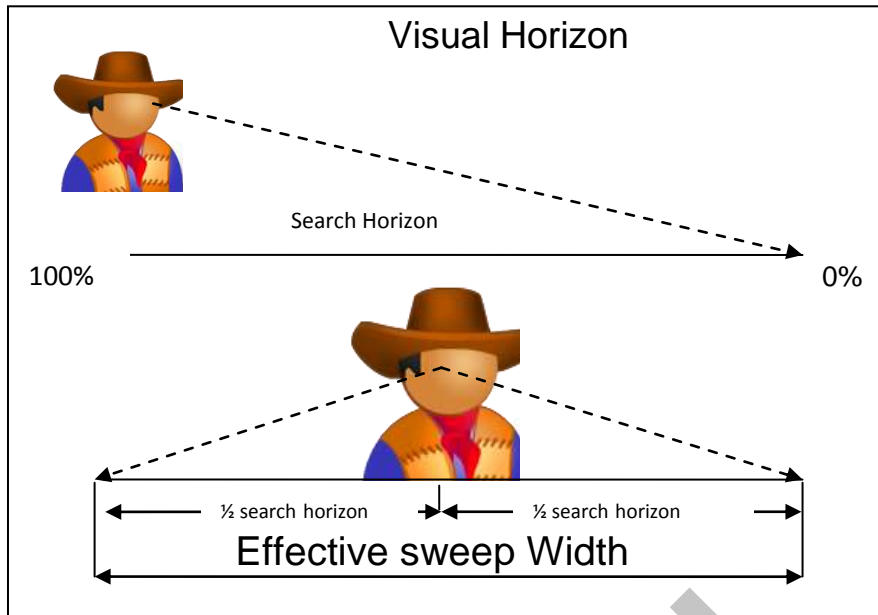
- 5.68.** The SMC should consider:
- a. the availability of search aircraft
 - b. the availability of suitable ground assets
 - c. logistical support for search teams
 - d. location of Field Headquarters
 - e. local weather conditions and expected forecasts.
 - f. Continual intelligence gathering
- 5.69. Search Area Coverage:** Once the search area has been determined, systematic search for the target should be planned. Factors such as the weather conditions, time available for the search, search assets available, size and dress of target, etc, should be taken into account. These factors are related but some are more important than others. In planning a search operation, the SMC should endeavour to meet the requirements of the more important factors while satisfying the requirements of the others as far as practicable.
- 5.70.** Search area coverage is the systematic search of a selected parcel of land to ensure the optimum probability of detecting the object being sought. The factors affecting detection capability have been reduced to four inter-related expressions. The terms and their symbols are:
- a. Area Swept (W)
 - b. Probability of Detection (POD)
 - c. Track Spacing (S)
 - d. Coverage Factor (C)
- 5.71.** The number of searchers and search teams will be a factor in determining search area coverage. More time will be required to search a large area thoroughly when there are limited numbers of search assets unless the distance between searchers and search teams is increased. This is not desirable since it would reduce the probability of detecting the target. It may, therefore, be necessary to seek additional assets, either land or air, from other sources. It is usually preferable to cover a search area from the beginning with an adequate number of search assets.
- 5.72.** When search assets are operating far from the Field Headquarters, consideration should be given to them being redeployed to an advance base so that more time will be available for the search and less time will be spent travelling to and from the search area.
- 5.73. Target Type:** The sweep width will depend on the type, size, colour and shape of the target, its colour contrast with the surrounding medium and whether or not the target is moving and responsive. Targets may vary from small children missing alone to a group of persons. It may also include a person in an inland waterway. All targets should be sought from a direction in which they receive the best illumination, colour brightness or contrast. This will normally be with the sun behind the searcher.
- 5.74. Meteorological Visibility:** If visibility conditions are poor, a reduction in sweep width will be necessary, with the subsequent reduction in POD. Other weather conditions that may affect a search effort include:
- a. Fog, snow, and rain will make visual searching difficult and will require very close spacing between searchers.
 - b. Smog and haze may reduce the effectiveness of night signals;
 - c. Low clouds may reduce the amount of contrast between the target and the surrounding medium;
 - d. Precipitation reduces visibility; and
 - e. Terrain and vegetation in the search area.

- 5.75. Type of terrain/ conditions:** The type of terrain to be searched obviously affects the ease with which the search target will be detected. The more level the terrain the more effective will be the search. Not only can the searchers maintain a constant distance apart, there is less likelihood that undulations or irregularities on the terrain surface will hide the target. Thus flat deserts are easier to search than rolling hills, while rugged mountain areas are the most difficult. The more trees, vegetation, rock outcroppings and other surface irregularities that exist on land, the more difficult will be the search.
- 5.76.** Open flat areas with little vegetation produce fewer shadows to confuse the searcher while dense forests have a multitude of shadows that can cause confusion to searchers. It is necessary for all searchers to be aware of the prevailing conditions and to modify their search techniques appropriately. The use of all six visual signals; silhouette, shine, movement, shape, spacing and shadow; when searching will provide the greatest chance of success.
- 5.77. Search speed:** The speed of all land searching will be dependent upon the slowest team member, but in some instances a slower speed will benefit target location, particularly in denser vegetation or in areas with a large amount of ground cover. A slower speed will enable team members to stop and search to their rear at regular intervals, thus looking behind ground objects.
- 5.78.** The effectiveness of a search team depends on the number of searchers available, their experience, alertness, physical condition, incentive and the suitability of the search pattern. The speed at which they search also has a direct relationship to the effectiveness of the team's overall performance.
- 5.79.** If feedback from the search teams indicates that searchers were excessively fatigued, it may be prudent to use a correction figure for fatigue and reduce the sweep width by 10 percent in any POD calculations. In the interests of Workplace health and safety if a team reported excessive fatigue the SMC should be considering removing them from the field and resting them.
- 5.80. Cloud cover and sun light:** The greater the amount of cloud cover, the less will be the ambient light in the search area. In a land situation this will reduce the amount of light with which to locate the target. In open areas with little vegetation the effects will be small, but in denser rain forests the effects may be to reduce the available search times dramatically.
- 5.81.** Objects are seen at a greater distance when looking down-sun as opposed to up-sun particularly in early morning or late afternoon. With a clear sky and a bright sun, search conditions are at an optimum between mid-morning and mid-afternoon when the sun is high. Bright sunlight is especially detrimental when haze is present, due to the diffusion of light. Colour contrast is lost when looking up sun, with the result that small objects merge into a confused pattern of glaring light and shadow. Down-sun the glare is absent, haze is more transparent, and coloured objects show a marked contrast to their background.
- 5.82. First and last search light:** The 45-minute periods after sunrise and before sunset are considered unsuitable for daylight visual searching on account of the sun's low elevation and resulting lengthy shadows.
- 5.83.** These periods are therefore commonly discounted for visual searching at the planning stage, but may be used to move teams to and from their search areas, maximising the time available on scene. There may be other factors arising that impact upon search planning thus indicating the relative suitability of visual search during some or all of these periods.
- 5.84.** Within proximity of the equator, where the apparent movement of the sun is at a greater angle to the earth's horizon and its rising and setting phases more rapid, these periods are less critical.
- 5.85.** Examples of local factors that may need to be considered in the context of available search light are:

- a. A search within a tropical rain forest may best be started at dawn in consideration of a likely deterioration in local weather conditions later in the day.
 - b. A search of the western slopes of steep sided valleys may best be delayed until mid-morning.
 - c. A search of steep eastern slopes may best be abandoned earlier than 45 minutes before sunset.
 - d. The search of desert areas may be suspended during the middle of the day as the sun will bleach out the environment and create mirages which will limit the effectiveness of any search.
- 5.86.** Time available to aircraft outside the periods suitable for visual search may be utilised in other ways, for example, beacon search, radar search or FLIR search.
- 5.87.** Searches begun early in the day, or extending late in the day have a reduced chance of success in wooded terrain due to the shadows cast by the trees and the oblique angle of the sun. These areas are preferably searched when the sun is higher in the sky. Likewise because of the sun, mountainsides may be better searched in the early or late in the day depending on the direction the particular slope faces.
- 5.88.** Unlike marine SAR there are no tables developed for land SAR. The sweep width used in a land SAR will be entirely dependent upon the vegetation and terrain being searched. The search horizon is the distance from the searcher where the chances of locating the target are zero. In open vegetation this distance can be considerable, while in a rain forest it may only be a few metres.
- 5.89. Visual Horizon:** In order to determine how far apart each searcher should be it is necessary to measure the search horizon for a particular vegetation type. This can be estimated from previous experience in this type of vegetation or can be determined through a more scientific method.

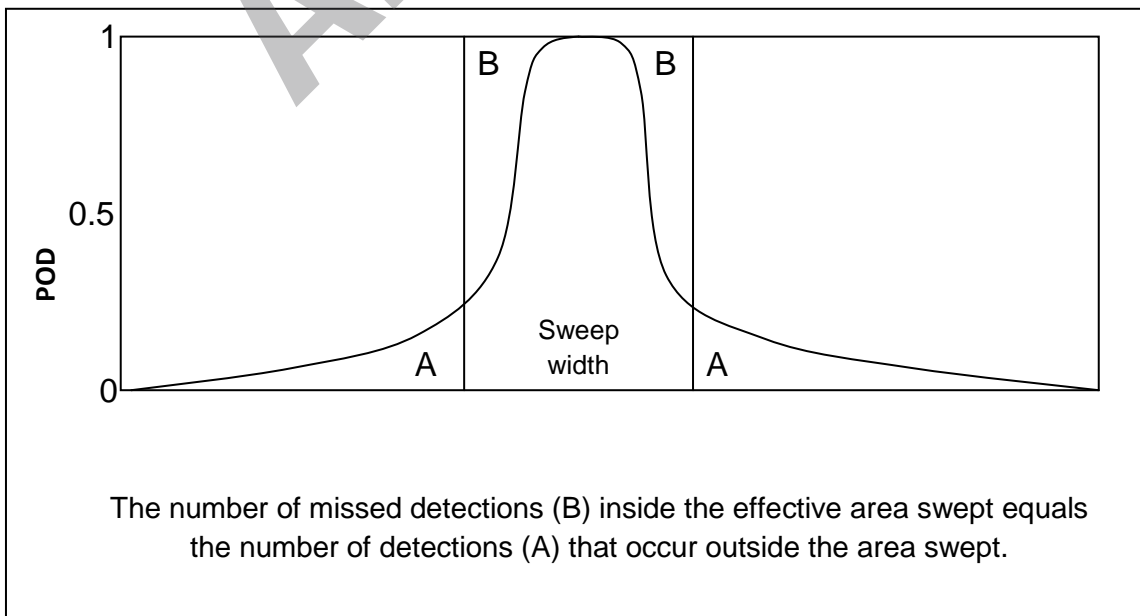


- 5.90.** Place an object of similar size and colour to the search target in the vegetation. Starting at the target searchers will walk into the vegetation until a point is reached when the target is not visible. Repeating this from several directions an average can be made of the distance measurements. This then becomes the search horizon for that particular vegetation. The searchers are then placed that distance from each other. This is the equivalent to sweep width in a marine world. The sweep width for an individual searcher will be the search horizon, spread evenly each side of the searcher.



Effective Sweep Width.

- 5.91. **Area Swept:** The Area Swept (W) is the total combined sweep width of all searchers in a team multiplied by the distance searched; the area searched by the entire team. Eg. If there are 10 searchers with a search horizon of 10 metres (0.01km) who have searched a distance of 2km then the total W for that team is 10 searchers x 0.01km x 2km = 0.2km². All measurements should be in kilometres for the calculations to work. More in Appendix I.
- 5.92. The zero detectability area of one searcher will meet that of the next searcher. The Bell Curve indicates that the probability of locating a target outside the sweep width is equal to the probability of missing a target within the sweep width. Aside from these calculations, the standard rule of thumb is that searchers should be able to see the ankles of the searcher next to them. This ensures that the area between searchers is search twice, once by each searcher.



Search Bell Curve.

- 5.93. Accuracy of navigation by Search teams:** The navigational accuracy with which a search team is able to reach a search area and then execute the search pattern has an important bearing on the coverage of the area and the POD. Dead reckoning navigation alone generally produces poor results. Map reading can be effective with the assistance of visual markers such as mountains, rivers and man made objects, but is very dependent on having good meteorological conditions. In areas where navigation aids are limited, search patterns should be selected so that greatest possible use is made of them. The use of electronic navigation aids is becoming increasingly prevalent and while a valuable tool, the basics of old fashioned map reading can not be eliminated.
- 5.94. Night Searching:** Before deciding to search at night, there is a need to assess the urgency as well as the possibility of success against the risk to search team members. Night searching is not a task for inexperienced searchers. Some advantages and disadvantages are listed below:
- a. Advantages of Night Searching**
- i. Tracks and signs show up much better at night when illuminated by a torchlight. The torchlight forces the searcher to concentrate on the small field of view given by the light beam. The concentration assists with the detection of small clues.
 - ii. Footprints and tracks are better preserved at night because they do not dry out as quickly and therefore maintain their shape and identity.
 - iii. In hot weather, night travel is much less strenuous than day-time travel.
 - iv. Human voices carry further at night.
 - v. Torchlight and fires can be seen by missing persons and can act as an attractant technique.
- b. Disadvantages of Night Searching**
- i. Possible risk to searchers
 - ii. The missing person may be injured whilst attempting to move to, or away from searchers that are heard in the dark.
 - iii. The possible accidental destruction of vital clues.
 - iv. Missing vital clues
 - v. Use of lights destroys searcher's night vision. On nights where there is a moon it is often beneficial to search without the use of torchlight. Given sufficient time for eyes to adjust it is surprising how much can be seen at night. Non use of a torch also allows eyes to be drawn to areas of colour difference which would otherwise have been missed outside the torch beam. The use of a red covering over the torch can provide a reasonable combination of light to see by but sufficient darkness to notice small details in the bush.
 - vi. Greater control problems for searchers.
 - vii. The natural fear of the dark may cause greater apprehension in the missing person and searchers. Do not disregard the fear of the dark. The searchers at the end of a line search conducted at night can be greatly affected by this fear, to the extent that they gradually move towards the centre of the line. Their concentration is also very limited although their imagination often becomes heightened.
- 5.95. Vehicle boundary patrols** are recommended at night and should utilise calling and listening techniques. A high point lookout or aircraft should also be considered.

- 5.96. Search Patterns:** The selection of a search pattern is very important and should only be made after all factors have been considered. The search pattern selected should meet the following criteria:
- Suitability:** It should permit the search to be completed within the time limits;
 - Feasibility:** It should be within the operational capability of the available search units;
 - Acceptability:** The expected result should be worth the estimated time and effort.
- 5.97. Safety of the search units:** Land search teams will not normally sustain injuries or damage if they run into each other, but the SMC must be aware of the terrain and any known or potential hazards that may make endanger the searchers. Where possible only those teams capable of negotiating the hazards should be used in those areas. Eg. Only teams experienced in vertical rescue should attempt searching cliff lines. Other hazards may include wildlife, bush fires, storms, loose or rocky ground, hidden caves or mines. These hazards should form part of the team briefing prior to commencing a search.
- 5.98.** If using vehicles, motor cycles, quad bikes or other motorised units, specific attention needs to be paid to the disposition of units within search areas. All vehicles should have their head lights on, regardless of the time of day. They should also carry, on their front bumpers, flags or pennants on flexible poles that exceed the height of the vehicles to warn other vehicle whilst negotiating crests. If flashing warning lights are fitted, they should also be activated. A team leader should be assigned to coordinate vehicle searching.
- 5.99.** It is common to utilise aircraft, both fixed and rotary wing, in land searches. A single aircraft assigned to a single search area can easily be coordinated. Multiple aircraft searching multiple areas can become a nightmare. Civil Aviation Regulations specify separation and height distances for aircraft. It is recommended that the aviation section of RCC be contacted to assist in the coordination of air searches involving multiple aerial assets. This will relieve the SMC of the necessity of developing search areas, spacings, heights and briefings. RCC will seek what areas need to be searched and all other relevant information and then develop suitable plans, including the issue of appropriate NOTAM's. These plans will be forwarded to the SMC for approval prior to being implemented. EMD will brief each individual aircraft and collate the subsequent results. Overall coordination of the land search will remain with the SMC.
- 5.100. Searching in hazardous areas:** Many different types of man made hazardous areas will be encountered by search teams in a wide variety of environments. Country or rural searching will necessitate searchers entering sheds, barns, machinery spaces during a search. Prior to entry the SMC should ascertain as much information as possible about the potential hazards to searchers. Information may include poisonous chemicals that should not be touched without gloves, potential breathing hazards that require face masks. Other dangers may include unprotected machines such as water pumps, grain augers, air compressors, all of which can cause severe injuries if clothing or limbs become trapped.
- 5.101.** Grain silos, feed bins and other containers that store large amounts of produce can be particularly dangerous and should only be searched by those who have operational experience with them.
- 5.102.** Within an urban environment building and construction sites present particular hazards to searchers. With the increasing occurrence of dementia/Alzheimer sufferers wandering from their homes it is often necessary to search these sites. Search team leaders should always approach the site foreman before entering onto a building or construction site. The foreman can then assign a person to guide the searchers around the site and provide advice about dangerous areas such as crane operating areas, concrete pouring sites, welding and cutting areas, compressor and electrical areas.. On the larger construction site it may be necessary for searchers to undertake a quick orientation or induction to that work site. It may also be a requirement that all searchers wear hard hats whilst on the work site. While

these sites need to be searched if they are within the search area unnecessary risks are not to be taken by searchers.

- 5.103.** If the search is being conducted at night or over the weekend/public holiday it will be necessary for the SMC to locate a site foreman prior to any searchers entering those particular areas.
- 5.104. Search Patterns:** The choice of search pattern is the prerogative of the SMC, who may elect to use only one pattern or several patterns simultaneously but in different areas. A series of search patterns may be used in sequence for the same area, e.g. indian file, track sweep. The following factors will influence the SMC's selection of search pattern:
- a. The accuracy of the LKP;
 - b. The size and shape of the search area;
 - c. The number and type of SRUs available;
 - d. On-scene weather;
 - e. The distance to the search area;
 - f. The availability of navigation aids in the search area;
 - g. The size and detectability of the search object;
 - h. The desired probability of detection;
 - i. The limitations of time; and
 - j. The terrain of the area where the search will be conducted.
- 5.105.** In order to achieve the greatest efficiency from search teams, it is necessary that each team be deployed to ensure the maximum terrain is covered in a sweep and all members are actively employed. This particularly applies where team members are tired and may tend to follow the leader without attempting to search.
- 5.106.** The SMC will determine the search pattern that is required to search a particular area. This will take into account the terrain to be searched, the target, number of searchers and capabilities of the search teams.
- 5.107.** The Team Leaders will be responsible for implementing the search pattern of the SMC. The Team Leader will also be able to modify the SMC search plan if the situation on-scene changes or a more efficient pattern is available. The Team Leader will communicate these changes to the SMC.
- 5.108.** The Team Leader will place individual members within the search pattern and allocate primary areas to be searched by each member. While on the move, the Leader must ensure members maintain their position within the pattern and remain alert.
- 5.109. Global Positioning Systems (GPS):** The use of GPS for navigation has been increasing over the last decade as they have been reduced in both size and cost. GPS are to be considered as another tool in the SMC's arsenal. While each search team should be able to navigate via a map and compass the issuing of a GPS to each team will provide a backup method of determining their exact location. When training, emphasis needs to be placed on gaining navigations skills using the older methods and not relying on GPS or other systems. The reasons for this are the bugbear for most modern technology, flat batteries. A GPS with a flat battery is no more than a paper weight. The GPS should be used as a method of confirmation rather than the primary navigation tool. Where they do come into their own is providing an exact recording of the search areas undertaken by that particular team. The search details can be down loaded onto a computer and overlaid on a map. This will indicate precisely to the SMC what areas were searched and what areas remain. This removes any doubt that a team leader may have in relation to their search. A GPS will assist when searching in featureless terrain or when natural boundaries are not available to define a search area. Spare batteries need to be carried by the search team. Although all GPS's provide similar basic information there is such a variety of operating procedures that training needs to be model or brand specific. Where possible GPS's of the same type should

be carried by search teams in the same search, allowing for technical information to be passed from FHQ to teams easily.

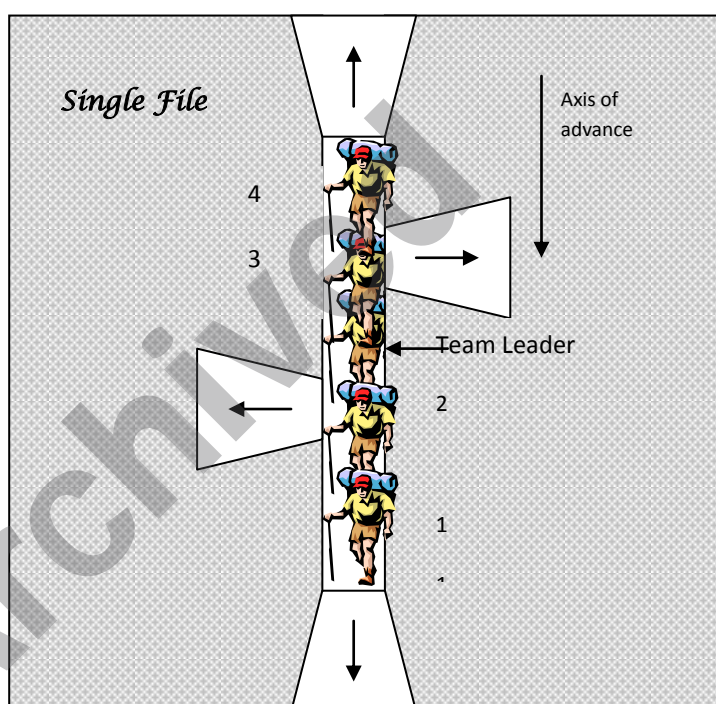
5.110. Common Search Patterns: Common search patterns which may be used to suit varying terrain and circumstances include the following:

- a. Single File
- b. Track Sweep
- c. Point and Flank
- d. Purposeful Meandering
- e. Parallel Sweep
- f. Creeping Line Ahead
- g. Square Search
- h. Contour Search
- i. Vehicles in Echelon

5.111. Indian File:

i. This pattern may be adopted when searching a foot track or narrow defile.

ii. The team travels along the track, one behind the other, searching the track and its immediate surrounds, paying particular attention to the member's primary arc of search. Position 1 will search ahead on the track and to approximately 45° to both sides. Positions 2 and 3 will be searching



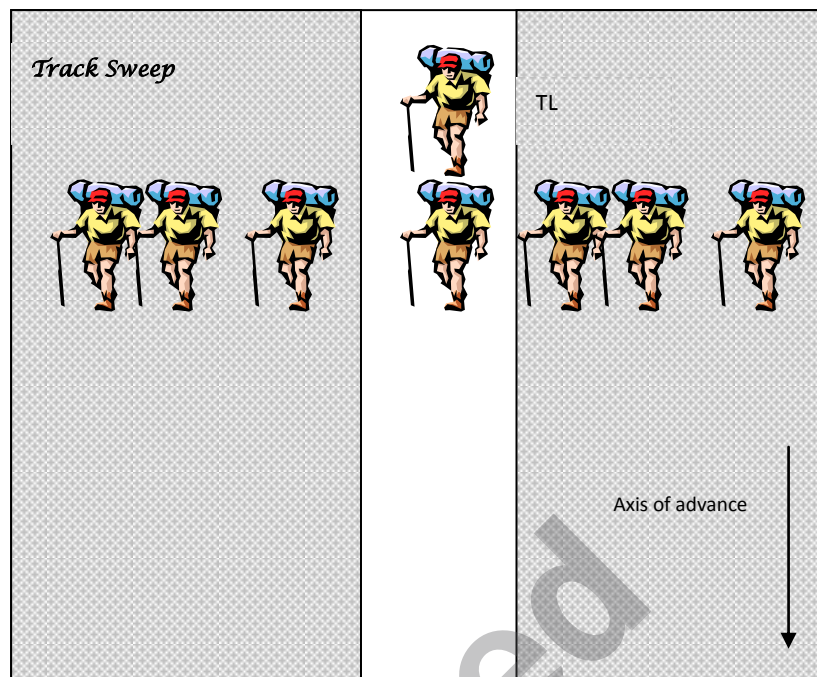
each side of the track from 45° ahead to 45° behind. Position 4 or the rear member will be searching the track, but stopping every ten metres to check behind all obstacles. The Team Leader is not assigned a search sector but will check all areas as required.

- iii. The Leader is positioned where best control of the team can be affected, usually towards the middle of the team.
- iv. This search pattern can be used when searching for a person who is expected to be mobile.

5.112. Track Sweep:

- i. Where terrain and vegetation permit, a more efficient pattern for searching a track may be a track sweep.
- ii. In this pattern, the Leader is positioned on the track, with the team forming a line extending either side of the track. This allows for searching an area out to the full span of the team.

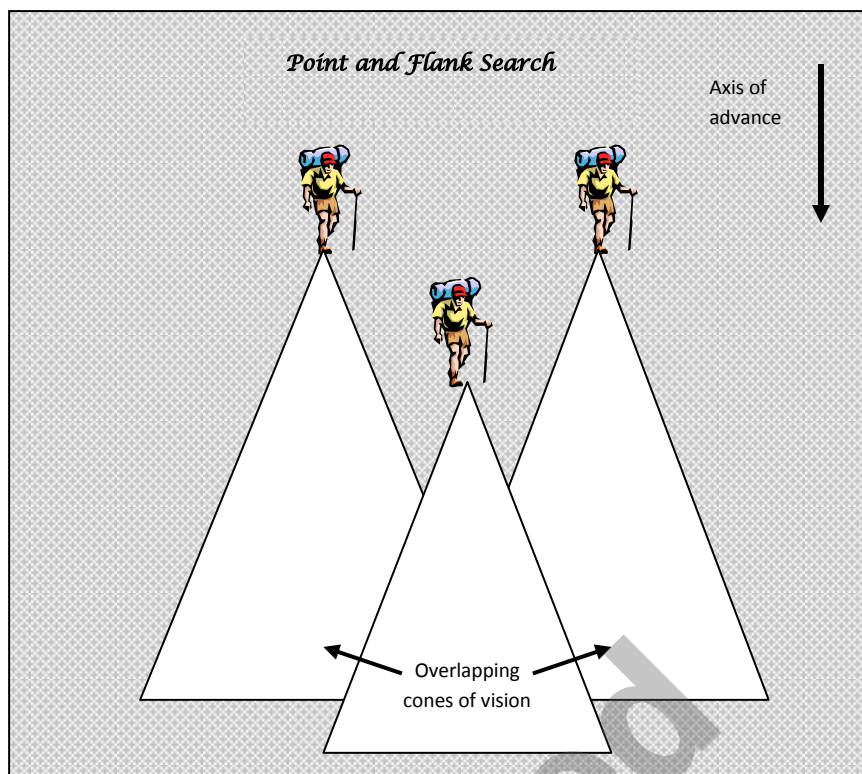
- iii. The distance between team members will be greatly dependent on the thickness and type of terrain being searched. Refer to earlier section for more details on separation distances.



- iv. This pattern can be used when the missing person is predicted to be mobile, but could also include persons who may sprain an ankle or fall injuring themselves. Missing persons have been known to sit or find shelter just off the edge of the track. Possessions, food wrappers and items of clothing may be discarded and tossed aside, landing a short distance from the track's edge.

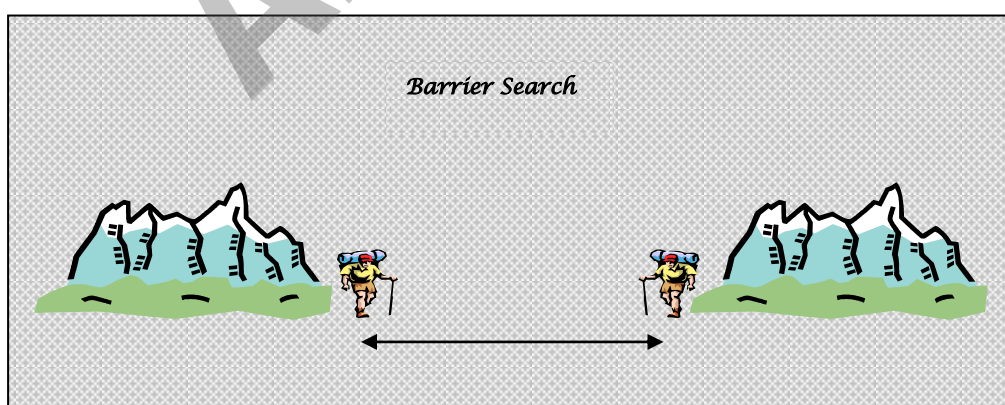
5.113. Point and Flank:

- i. A common approach to following a track is with a three person team. The three-person team, comprised of a point person and two flankers, has several advantages. This is a method commonly used by armies throughout the world to locate targets, enemy or otherwise.
- ii. This pattern allows for consultation in difficult situations because three heads are better than one. If a searcher can convince another searcher that they are seeing a sign, then the chances are that it is a sign that is being observed.
- iii. When training, this method builds confidence, reduces errors, and benefits searchers by allowing a verbal exchange of the details of what is being observed rather than just mutually looking at a clue or disturbance.
- iv. It allows for the rotation of the point person, who may be physically on their hands and knees on the ground searching for a sign. Point is a tiring position, especially when signs are limited.
- v. The team can split up at track junctions, with team members going down each track for a short distance. Any team member can call the team back together when they find a sign indicating the correct track.
- vi. This search pattern is not suitable in all terrain or conditions. Three member teams may not always fit in with the current team structures in some organisations.



5.114. Barrier:

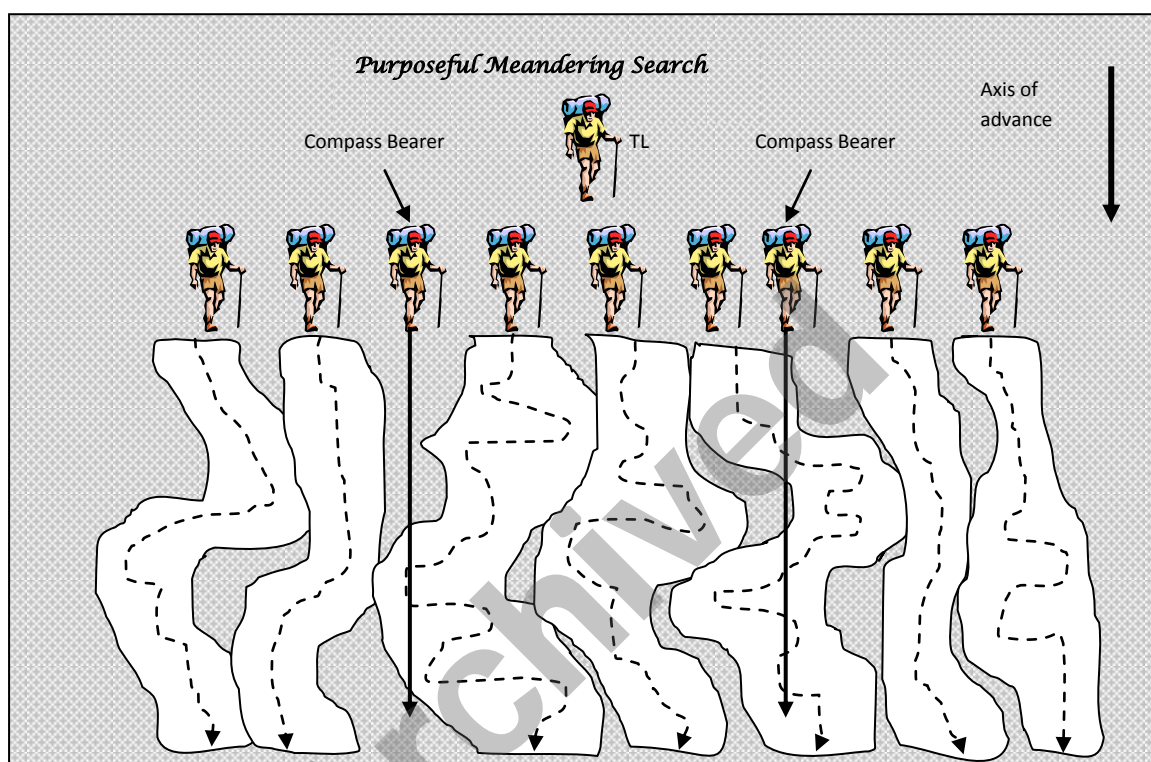
- i. This type of search is set up between two search boundaries and is aimed at locating the missing person as they travel through a search area.
- ii. The boundaries need to be of sufficient definition to funnel the missing person through, such as rivers or cliff lines.
- iii. The search team travels back and forth between the boundaries, keeping a lookout for the missing person.
- iv. This can be done with a small number of searchers or by vehicle if need be.



5.116. Purposeful Meandering:

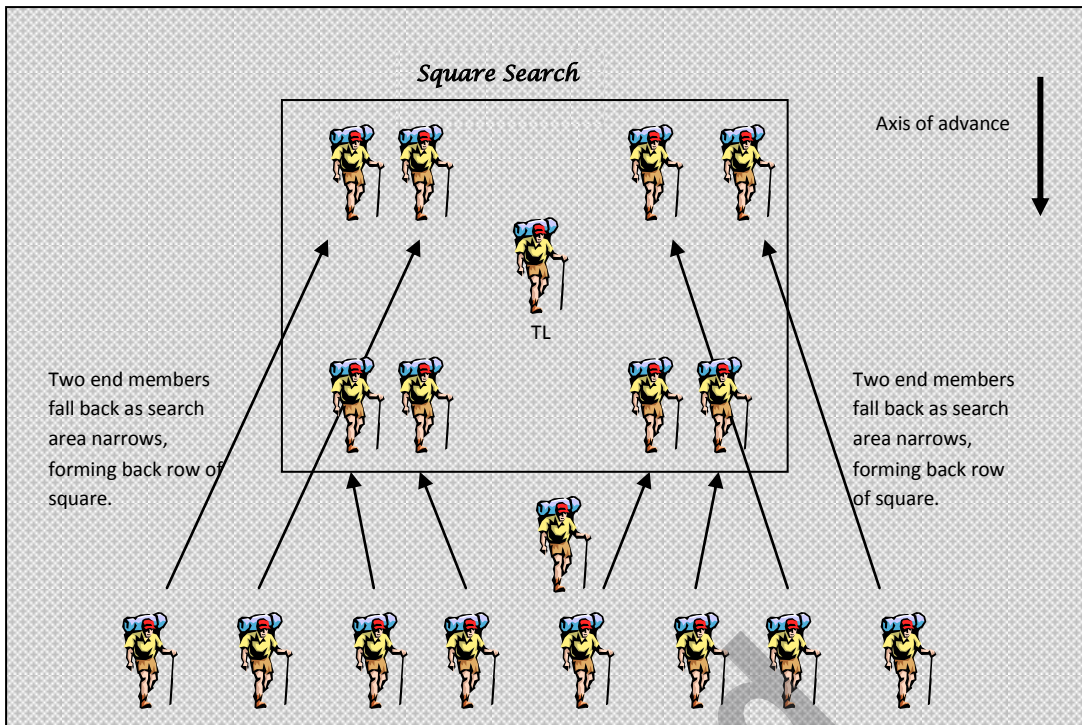
- i. This type of search can be used in most circumstances when the search area is defined.
- ii. The team is arranged in a line facing the direction of travel.

- iii. Several members of the team have compasses and act as guides to the remainder of the team.
- iv. The Team leader remains at the rear to provide overall supervision.
- v. Each team member is free to wander or meander through the search area, to check out objects or sightings that catch their attention. Some objects may be better seen from the side and so escape the attention of a searcher coming from the front.
- vi. Each searcher has a definite visual horizon, and as can be seen in the diagram there will be areas searched or scanned several times by different searchers and also that there will be areas that are not searched at all.



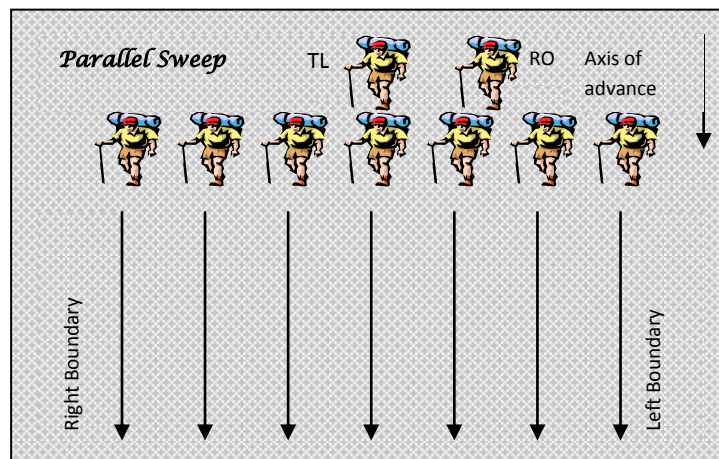
5.117. Square:

- i. When searching on a restricted front such as a gorge, the square pattern may be adopted. This will gain the maximum advantage from a team which can not be extended to a full span.
- ii. This pattern can also be adopted while conducting a Track Sweep Search when the terrain closes in on the ends of the search team. Rather than bunching up the team members they can be formed into this pattern.
- iii. In this pattern, the Leader is positioned to best advantage, usually in the middle of the team. The members are placed in pairs to the front and the rear sides of the Leader's position.
- iv. The two forward groups will search ahead and to 45° each side. The two rear groups will search from 45° each side to 45° to the rear.



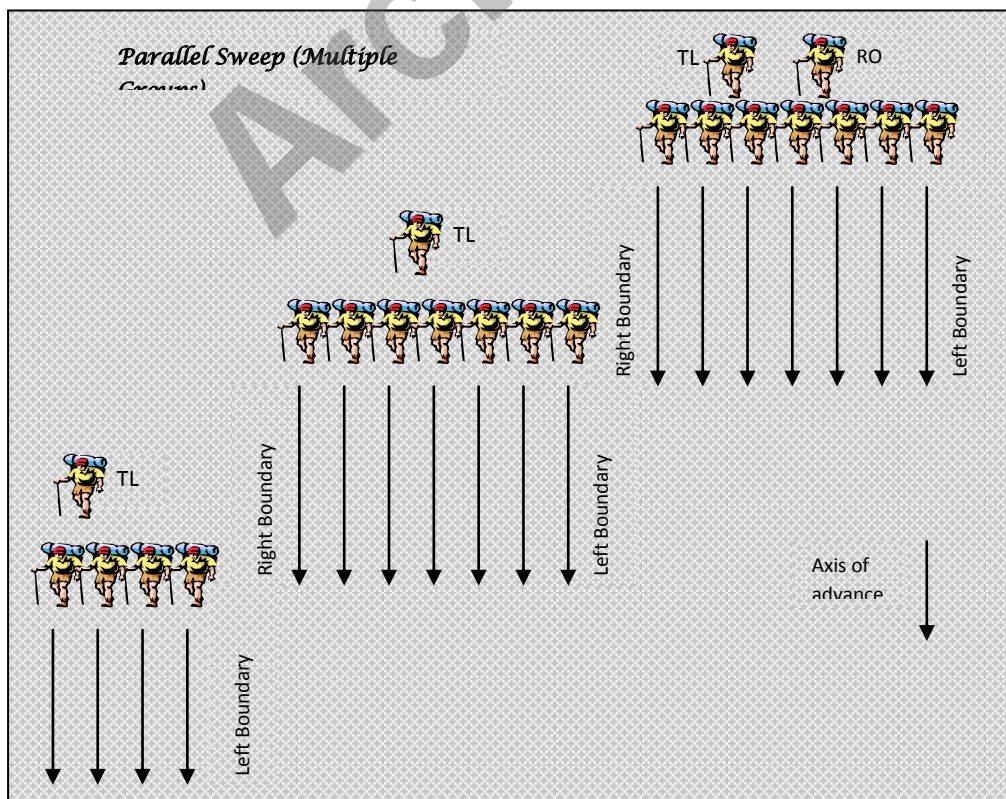
5.118. Parallel Sweep (Single Team):

- i. The parallel sweep pattern searches are used when the terrain and vegetation allow adequate control. This formation is normally used in contact searches when thorough coverage of the ground is required.
- ii. It is used when the area to be covered can be done so in a single sweep.
- iii. The simplest method of conducting a search is generally by the parallel sweep where a team will move through the search area paralleling a feature, such as a fence or road, or moving on a determined compass bearing.
- iv. In this pattern, the members are positioned parallel to a start line with the Leader located at the rear middle of the team. Under the direction of the Leader, the team sweeps forward from the start line until the area has been completely searched.
- v. Refer to section 5.89 for more details on determining the distance of separation between searchers.
- vi. The speed of this search is governed by that of the slowest searcher. The Leader must ensure that all members proceed at the same pace, as this will ensure that there are no gaps left in the line and all areas are covered.
- vii. This search should only be used in areas where the terrain is of the same type, therefore allowing all team members to search at a similar pace.



5.119. Parallel Sweep (Multiple Teams):

- i. Where a large open area is to be searched, it is possible to use multiple teams in an extended line.
- ii. When using multiple teams it is better to stagger the teams rather than combine all personnel into one large line.
- iii. The terrain and vegetation for all search teams across the line should be of similar type, allowing for all searchers to proceed at a similar pace. If there are great disparities in terrain or vegetation type or thickness, consideration should be given to dividing the area into smaller areas of the same type.
- v. In the example shown below the left hand team with the boundary on the left begins the sweep. The left hand member keeps the boundary while the right hand member marks the right hand edge of the line. After a suitable period of time, the second Team begins the advance, with the left hand member finding the marked boundary left by the previous team. The right hand member of the second team marks the right hand edge of the second team's line. After a suitable period, the third team begins the advance, and so on. The search boundaries should be marked out with a biodegradable material such as toilet paper, used at regular intervals but close enough to be able to be easily seen by all searchers. The paper can be dyed for use on different days.
- vi. If a team catches up to the team in front in the staggered formation, it will be necessary for that team to pause to enable the front team to advance further ahead. Do not allow the teams to combine into a single line as control is too difficult.
- vii. The search line leader controls the movement of the teams through individual Team Leaders.
- viii. To assist in control, the search line leader will generally need to have available a radio operator to transmit instructions directly to the Team Leaders.
- ix. The search line leader's radio should be on a separate frequency to the search control net.

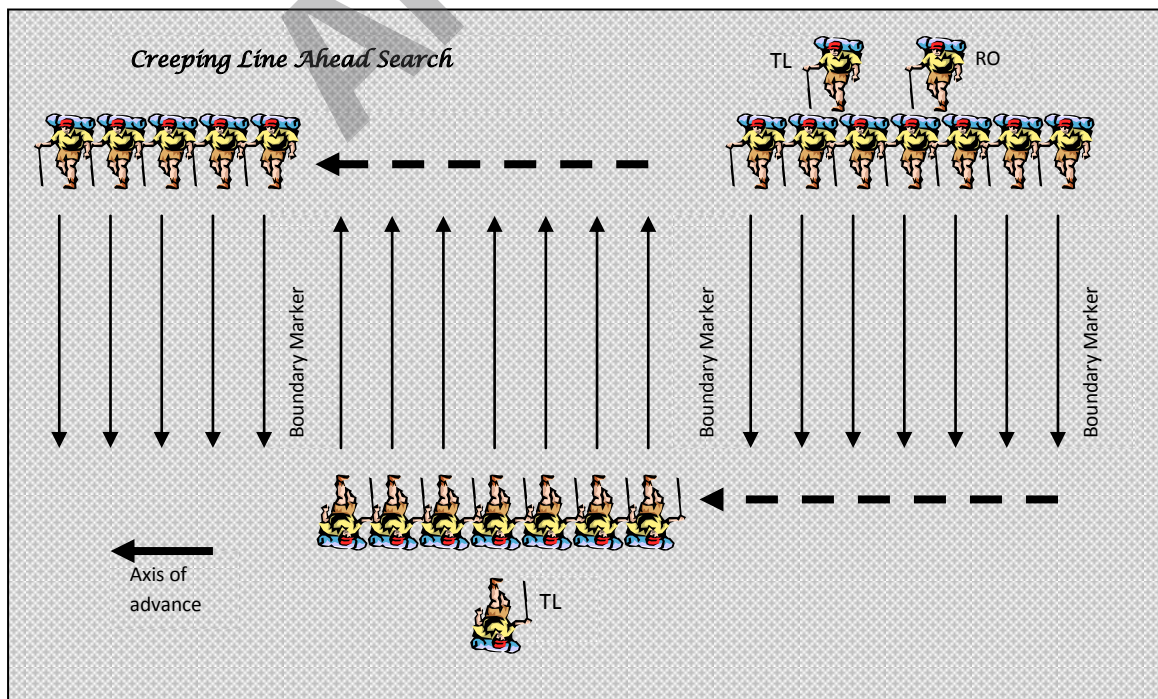


5.120 Creeping Line Ahead:

- i. Where team strength does not permit the searching of an area in a single sweep, the area may be searched in a series of sweeps known as the creeping line ahead search formation.
- ii. This method is particularly applicable in thick vegetation or rough terrain where control problems may preclude the use or employment of large teams.
- iii. To conduct this search, a start line and search boundaries are determined.
- iv. The team is placed in a parallel line along one of the boundaries, perpendicular to the line of advance.
- v. The leader is positioned toward the middle and behind the team.
- vi. The team members on the flanks are tasked with marking the limits of their search. The search boundaries should be marked out with a biodegradable material such as toilet paper, used at regular intervals but close enough to be able to be easily seen by all searchers. The paper can be dyed for use on different days.
- vii. The team member acting as the marker will not be able to concentrate entirely on searching because of the distraction of tying the material to the tree. This needs to be allowed for in relation to the area covered and to the speed of advance.
- viii. Before beginning, a number of strips of toilet paper can be prepared, assisting the marker in carrying out the task.
- ix. The team searches the area from boundary to boundary in a series of sweeps, moving back and forth from the start line until the area has been searched.
- x. When redeploying for a return sweep, it is essential that the team leader maintains control and ensures that the changeover is conducted as smoothly as possible.
- xi. To ensure a smooth change, there are two suggested methods:

Method One:

- a. The team on reaching the boundary halts and the member at the axis of advance (end of the line) marks the limit of search.
- b. The team then turns in the direction required and moves one team span past the marked limit thus maintaining their original position within the search line.
- c. The team then sweeps towards the opposite boundary.

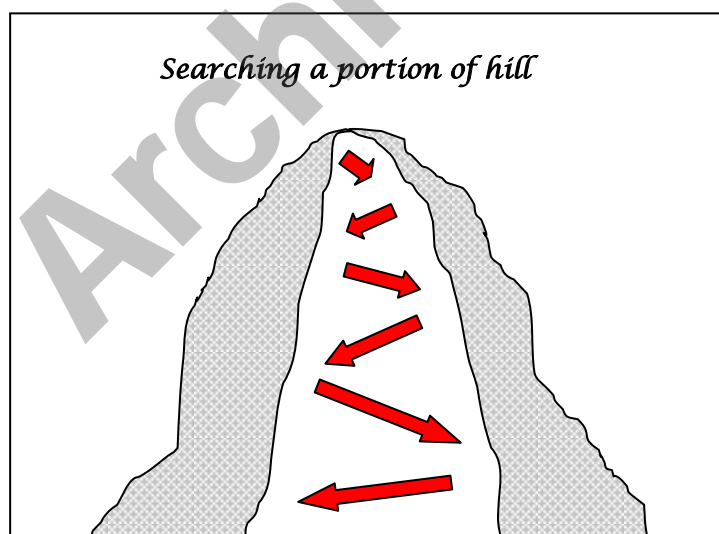


Method Two:

- a. On reaching the boundary marking the limit of search and turning in the direction of the axis of advance.
- b. The member at the axis maintains position, the remainder of the team by-passes and forms up after one team span.
- c. The team then sweeps towards the opposite boundary.

5.121. Contour:

- i. It is rare that an entire hill or mountain will be searched in one go. It is more often that segments of slopes will need to be searched.
- ii. When searching hills, ridges or spurs, it is advisable to commence searching from the high ground. This allows searchers to observe the ground from height, rather than attempting to look up a slope. There is often a road or track on a spur from which to commence a search.
- iii. Segment a hill, spur or slope into sections and search between the sections using boundary markers.
- iv. Safety is paramount as walking across slope is always more risky than walking down slope or up slope.
- v. When searching the face of a slope consider using either a creeping line ahead approach or a staggered line approach to minimize rocks and debris being moved down the slope to other searchers.
- vi. In any search of hilly or steep ground, control must be maintained and the speed of advance adjusted to suit the terrain and the capacity of the searchers. If this is not done, injuries, particularly to ankles and knees, may occur.

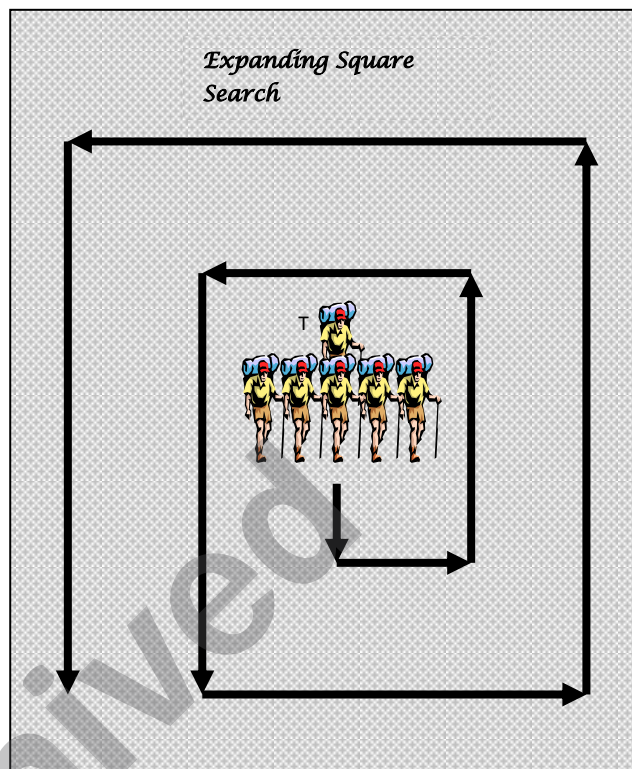


5.122. Expanding Square:

- i. The purpose of this technique is to closely search an area of high probability. It is particularly useful for thorough coverage of small areas. This technique is suitable for a maximum of 15 searchers.
- ii. A person is required to mark the outer boundary and ensure that the correct boundary is being followed.
- iii. Another person is required to locate the inner boundary. This ensures an even movement of the search line from the inside edge.

- iv. It is essential that the Team Leader directs the search from a central position behind the line.
- v. Method: Mark out a grid square of approximately 50 metres centred around the area where close searching is required by using compass bearings and toilet paper or similar. Next:

- a. search the inside of the grid with a contact search;
- b. set up a line from one of the outside corners of the grid and move around the grid in one direction;
- c. continue searching in this manner, spiralling out and around the grid square (it will gradually become circular);
- d. the line will become unmanageable with more than 15 searchers; and
- e. in very thick bush, an expanding square search will take about



3 hours to search an area 300 x 300 metres.

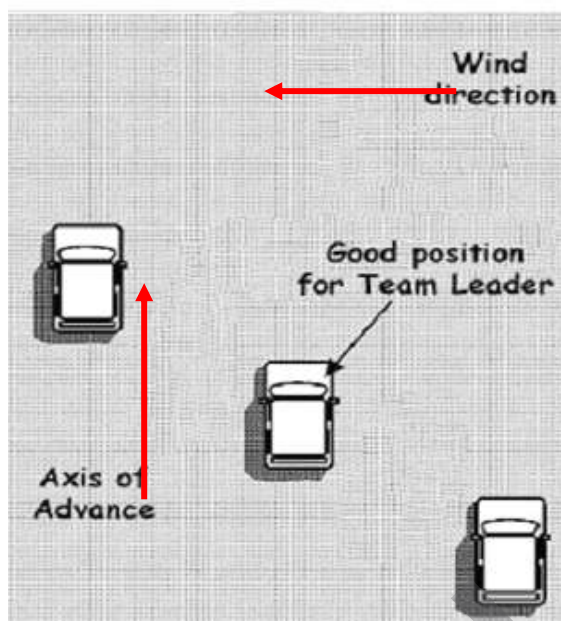
5.123. Vehicle Search Patterns: The search patterns discussed so far are suitable for searchers on foot or horseback and may be adapted for use with vehicles. Vehicles can be a major asset to a search when they are used to patrol boundaries, firebreaks and tracks. Where the land is open for long distances, particularly in the drier, more barren regions, vehicles can be used to conduct sweeps across the land much the same as a foot team.

5.124. Visibility: A problem with vehicles travelling in formation is the loss of visibility owing to dust. This will be particularly prevalent in dry or arid conditions. When driving vehicles in dusty conditions, it will be necessary for following vehicles to travel outside the dust cloud of preceding vehicles.

5.125. Echelon Pattern:

- i. The most suitable method under these conditions will be to echelon to the right or left of the leading vehicle. The vehicles need to maintain a position just slightly in front of the dust cloud so as to have adequate vision and adjust their position to suit the circumstances.
- ii. If this method is adopted, the likelihood of vehicles colliding, striking obstacles or ditches, or becoming bogged is reduced.

Vehicles in Echelon

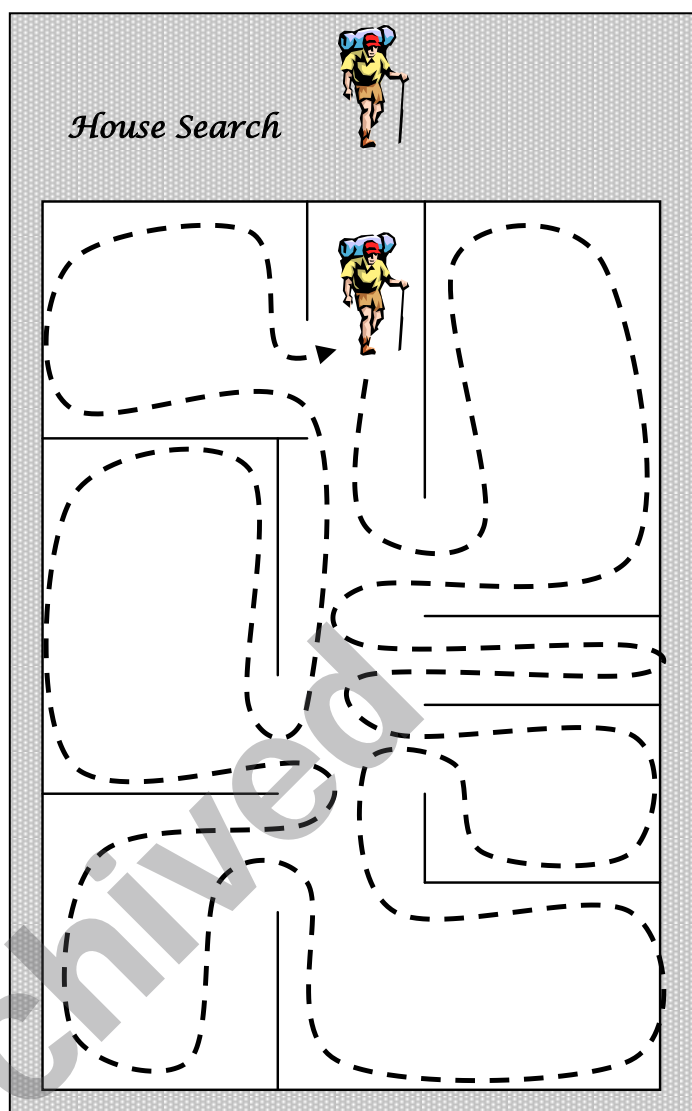


- v. The distance between the vehicles will depend on the terrain and the size of the object to be found. A general rule of thumb is that the bottom of the tyres must be able to be seen on the next vehicle. This will ensure that the vehicles are close enough to be able to see any missing person in between.
- vi. Searchers within the vehicle must be strategically placed to scan the ground. At no time must any searcher be placed externally to the vehicle, eg on the roof rack or bull bar, while the vehicle is in motion. Standing on the roof rack while using binoculars to scan the area is a valid technique while the ignition keys are removed from the ignition of that vehicle.
- v. Each vehicle should have at least four personnel. The driver's role is to only safely navigate the vehicle. The passengers search where they are directed to by their team leader. The front passenger will search forward and 45° to each side. The rear passengers will search from 45° ahead to the rear on their respective sides.

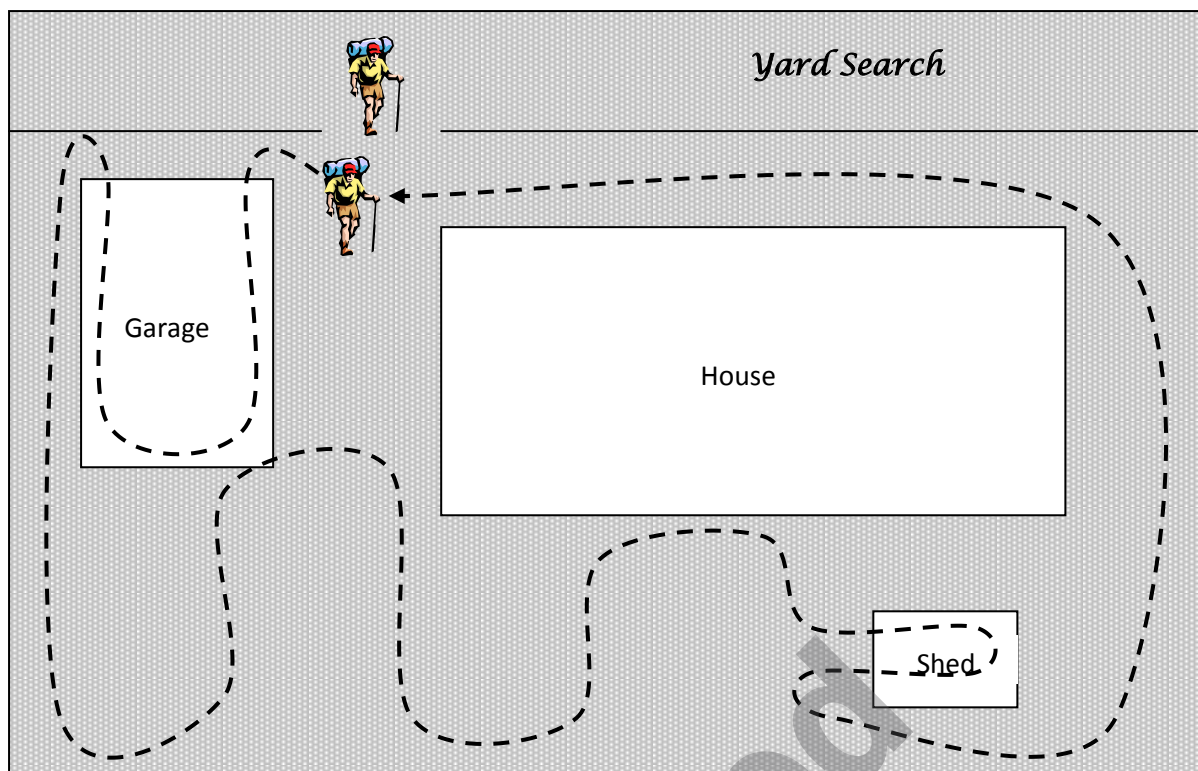
5.126. Urban Search Patterns: Searching in an urban area can present some difficulties when it comes to determining which search pattern is best. Most of the above patterns are not suited to an urban environment and would present some safety hazards as members would be walking on roadways.

5.127. Urban searching requires houses, yards, industrial areas and vacant allotments being searched and cleared. To ensure each is done correctly and to ensure that all areas are covered they should be done systematically and methodically.

- 5.128.** When searching a house it is important to ensure that all persons are outside and that no one enters except the searchers. One searcher will remain at a doorway to limit entry. A second searcher, or two, will enter the house and search all the rooms in a circular direction, starting with the rooms on the left. Each individual room is then searched in a circular pattern, looking in, under and over every piece of furniture in the room. As a room is cleared the door should be closed indicating that it has been done. Once the house is cleared the doors should be closed or the owners allowed to return.



- 5.129.** A similar pattern is adopted when searching a yard, vacant block or industrial area. One searcher remains at the entry point to prevent other from entering. One or more searchers clear the area in a circular pattern. This will enable to entire area to be searched to a high probability and also ensures that no areas are left unsearched.
- 5.130.** As with the house search, it is necessary for every object of a size capable of hiding a person to be searched. All buildings, sheds, outhouses and even dog kennels should be checked. Searchers should be instructed to look under objects, over then and in them. They should also look behind at regular intervals to check the reverse sides of objects. While adults may find it difficult to hide in a yard a child can quite easily located a small nook and fall asleep while searchers pass by unaware. Where possible have a mixture of male and female searchers in teams, as their different search techniques will compliment each other.



- 5.131. Search Pattern Conclusion:** The Team Leader is responsible for ensuring the team is employed to best effect, so the search pattern adopted must suit the circumstances.
- 5.132.** The leader should check team members at frequent intervals to ensure their safety and physical condition.
- 5.133.** When vehicle extrication of the missing person or the search team is contemplated, it is advisable for a team member to move to the road, track or identified rendezvous to:
- await the arrival of the vehicle; and
 - then guide the vehicle to the site.
- 5.134.** When conducting a search, it is desirable to navigate by identifiable features rather than committing teams to navigate by compass. In areas where map and compass must be used, ensure that there are members within the team who are competent in their use.
- 5.135. Clue recognition and Interpretation:** A clue is a fact, an object, information or some type of evidence that helps to solve a mystery or problem. The purpose of seeking clues (gathering all the facts and information) is to assist in the reasoning of a problem and its ultimate solution.
- 5.136. General Principles:** The following principles apply:
- Clue seeking is an ongoing process that starts with planning, continues throughout a mission and doesn't end until the debrief concludes.
 - Clue seeking is a skill and must be practiced to develop a sense of what is the minimum information to work with.
 - Avoid forming opinions and then gathering information to support that opinion.
 - Don't immediately form an opinion about the value of a clue.
 - Gather information from everyone, as no one person can adequately gather all the facts.
 - Assemble a complete profile of the missing subject and the situation, and let it offer direction.
- 5.137.** The theory of successful searching is dependent on clue detection and comprises five basic elements:

- a. Subject or clue generator.
 - b. Clues or messages.
 - c. Search area.
 - d. Searcher or clue seeker.
 - e. Time, as it relates to a sequence of events.
- 5.138. Subject or Clue Generator:** A lost person can become a prolific clue generator. The difficulty for searchers is separating these clues from those generated by other persons in the area. Strategic clues may suggest the period the person has been missing, their intent or destination. Tactical clues relate to clothing, equipment, footprints and discarded articles.
- 5.139. Clues to be Sought:** Searchers should try to locate clues that provide the following messages:
- a. The present location of the subject is
 - b. The previous location of the subject was
 - c. The destination or intent of the subject was
 - d. The subject was not here.
- 5.140. Categories of Clues:** The categories of clues that searchers should seek are as follows:
- a. *Physical* (eg, footprints, clothing, equipment or food wrappers).
 - b. *Recorded Information* (eg, a trip plan or trail register).
 - c. *Witnesses*—People who knew of the intent or destination, or people who have seen the subject, or other persons in the search area.
 - d. *Events* (eg, flashing lights, smoke, fire, or noise such as a whistle).
- 5.141. Search Area:** Steps should be taken to contain the search area to reduce the amount of clues that may be generated. Where clues are found outside a designated search area, it may be necessary to extend the search area.
- 5.137. Searchers or Clue Seekers:** The Field Search Controller needs to deploy the searchers or clue seekers throughout the search area and in particular, the most probable areas. A strategy is required to ensure that all clues are assessed and pertinent clues are acted upon.
- 5.138. Probability of Detection:** Clue detection demands intelligence, concentration and determination on the part of the searcher. The loss of concentration and fatigue may inhibit clue detection. Therefore the SMC should employ a redundancy principle with the searchers to ensure that searchers can maintain their effectiveness.
- 5.139. Time Sequence:** Time as it relates to a sequence of events is very important. All clues found should be time-tagged by searchers to assist in the reconstruction of events. It is essential that a log be maintained at the FSH to record the time and locations that clues were located.
- 5.140. Calculation of Search Time:** When evaluating the search time available from search assets, certain factors must be taken into account, where applicable:
- a. total endurance of each SAR asset;
 - b. transit time from FHQ or base to search area;
 - c. necessary fuel reserves at final destination;
 - d. first and last light at departure and destination
 - e. weather conditions in the search area, and destination points, and any requirement for holding fuel or alternate aerodrome for aircraft.
 - f. any other operational limitations; and
- 5.141.** In most cases, time in transit to the search area may be calculated using speed and the distance between the points of departure and destination and the mid-point of a search area.
- 5.142.** Operational factors may limit the search time available from a specific aircraft, examples being the time at which an aircraft will become available, distance from mandatory servicing facilities, and other commitments of the operator that may require the return of an aircraft at a particular time.

- 5.143. Investigation Time:** A search asset may sight objects that require investigation; therefore an allowance for the time taken to investigate must be made. The basic allowance is 15% of total time available in the search area, but the SMC may decide to increase this figure. The number of sightings investigated by previous search crews will influence any such decision. These, in turn, will be influenced by the nature of the terrain, the amount of flotsam on the sea etc. Over heavily timbered, mountainous terrain the allowance may need to be as high as 50% of total search time.
- 5.144.** When obtaining data about aircraft availability, special consideration should be given to the speed at which the aircraft will be flown whilst on search. In general, to provide for optimum scanning by observers, search aircraft should fly as slowly as possible. There are, however, other aspects to be considered, particularly the time available for search and the need to cover the area expeditiously. It may be beneficial to discuss these interacting considerations with operators. Some aircraft operate in excess of 120 KTS when on search; although this is less than optimum, logistic considerations may dictate the use of these speeds.
- 5.145.** Comparison of the search time required with that available will reveal whether the aircraft resources available are enough, too much or too little.
- 5.146.** At this point, a critical decision related to aircraft allocation may be made. The time required for search is directly related to track spacing; track spacing, in turn, is directly related to search height. It is feasible, therefore, that despite first indications that insufficient resources are to hand, timely coverage of the whole search area could be achieved by the available aircraft for the sake of a higher-than-optimum search height.
- 5.147. Briefings:** Briefing and debriefing is essential to the success of any search task. It would be difficult to locate a person if those involved are not correctly briefed as to what they are looking for and where they should be looking. It will also be difficult to identify and address issues that come to light if debriefing methods are ineffective. Searchers must understand their role and how to deal with any finds and other issues.
- 5.148.** The two distinct parts to a briefing are:
- a. the preparation; and
 - b. the conduct.
- 5.149. Preparation:** Experience has proven that the selection of the best possible venue and the use of suitable aids will enhance the value of the briefing.
- 5.150. Presentation:** The credibility of the briefing can be diminished if the briefing officer fails to project a professional approach.
- 5.151. Venue:** The selection and preparation of the best venue available is vital for the delivering of information and retaining attention. Consideration should be given to:
- a. Large enough to accommodate all attendees comfortably.
 - b. Open to authorised personnel only.
 - c. Identified as a briefing area so that seating and display arrangements may be laid out in advance. This area may also function for media/public relations/briefings.
 - d. Situated so there is minimum distraction by outside activities.
- 5.152. Lighting:** Adequate lighting needs to be provided so that all present can see displays clearly and can take notes.
- 5.153. Weather Protection:** Where possible, the briefing should be held in a covered location where protection from wind, rain or sun is provided. In field conditions, efforts should be made to ensure that the area is as protected as the circumstances allow.
- 5.154. Briefing Aids:** The following may be considered for use during a briefing:
- a. **Maps**—A map will be required to show Team Leaders their areas of responsibilities and their relationship to other teams and activities. These may range from a

topographical map to a map scratched on the ground. In any case, do not clutter the map with unnecessary detail. If possible, copies of the map should be provided to Team Leaders for their own reference and their subsequent briefings of their teams. If maps are not provided, time needs to be allowed at the end of the briefing for Team Leaders to make copies of their relevant sections.

- b. **Models:**
 - (1) Map models take a long time to prepare and are generally of little use.
 - (2) A model figure similar in stature and dress to the missing person may be useful in some circumstances.
 - c. **Photographs**—Attempt to obtain a recent photograph and circulate copies to searchers. If employing aerial photographs, ensure that those interpreting them are competent in their use. This style of photography may be very confusing to the uninitiated.
 - d. **Display/Chalk Boards**—One of the most useful aids is the display/chalk board. If information is to be displayed using this system, ensure that it is kept out of sight until required. When the board is produced, ensure that it can be seen by everybody. To gain the most advantage from this medium, coloured chalks or pens should be used to highlight the display so as to make it as clear as possible. The briefing officer should explain clearly the information displayed.
- 5.155. Conduct:** Once having prepared the venue and aids, the briefing must be conducted in such a manner that the briefing officer controls the activity.
- 5.156. Sequence:** To ensure the briefing flows smoothly, observe this sequence:
- a. **Introduction**—The briefing officer should thank all for attending, and introduce him/herself. State his/her position and operational role. State the content of the briefing;
 - b. **Visibility**—Ensure that all present can see the briefing officer, and any aids used;
 - c. **Notes**—Ensure that everybody present has writing materials, and is prepared to take notes (writing materials should be on hand);
 - d. **Maps**—Maps should be issued before the start of the briefing so that they may be marked or referred to as the briefing proceeds;
 - e. **Questions**—Stipulate that there will be no questions or interruptions during the conduct of the briefing and that time will be made at the end for any questions. Regardless of circumstances, time must be allowed at the end for questions and answers; and
 - f. **Topography**—Before the briefing, it is necessary to describe the area where the teams will be operating. Ensure that all present can identify this location and can orientate themselves to the ground. The briefing officer should then explain all features relevant to or likely to effect the plan, including:
 - (1) the terrain in the area;
 - (2) difficulties in travel;
 - (3) possible hazards; and
 - (4) any other similar related information. Control features, such as start and finish points and boundaries, should be highlighted.
- 5.157. Orders:** Operation orders are conveyed to those whose task it is to carry out the Search Commander/Field Search Controller's requirement. Such orders need to be:
- a. correctly prepared;
 - b. presented in a systematic way to ensure those receiving the orders understand their tasks; and
 - c. re-examined as a result of information gained through debriefs.
- 5.158. Orders must:**
- a. be accurate;

- b. be brief but clear;
- c. contain all necessary information;
- d. be capable of being actioned; and
- e. be received in time to be acted upon.

5.159. Layout of Orders: Orders need to follow a logical sequence to ensure all aspects of the plan are covered. To achieve this, orders are divided into five main headings of:

- a. **Situation;**
- b. **Mission;**
- c. **Execution;**
- d. **Administration and logistics; and**
- e. **Command and communications.**

By employing the first letter of each heading, the catch-word SMEAC is derived.

5.160. Situation (What has happened): This gives the background of events in sequence (what has happened what is happening) and gives general details of the teams that will be employed. This may include the following:

- a. **Person/Object**—Relevant details regarding the missing person or object.
- b. **Topography**—A general description of the search area using maps, sketches, air photographs, sand models etc.
- c. **Other Search Teams Operating**—The teams which share search boundaries with your area. Details include:
 - (1) identification; and
 - (2) other relevant information as applicable.
- d. **Additional Resources**—Those which need to be available for the operation are:
 - (1) aircraft: fixed-wing and helicopters (if helicopters are available for support, give locations of known landing points in the search area);
 - (2) vehicles;
 - (3) dogs;
 - (4) horses; and
 - (5) trackers.
- e. **Own Resources**—This is particularly important when briefing search teams from other areas who are not familiar with your procedure. This should include names of key personnel, layout of headquarters, medical and welfare facilities etc.

5.161. Mission (What the task is): The mission is a clear, concise statement of the task. It should begin with: 'Our mission is to'. This statement should be only one sentence long and needs to be repeated so that teams are sure of their task.

5.162. Execution (How the task is to be accomplished): This begins with an outline description of how the task is to be conducted, immediately followed by a detailed description of the roles and tasks of each team. To ensure that no relevant points are missed, these sub-headings should be used:

- a. **General Outline**—This is a short description of the overall conduct of the operation so all teams involved are aware of the broad picture; eg. 'The search will be conducted in the areas shown and will involve six teams. Four teams will be employed in the initial search and two will be held in reserve. Should there be no result in this area, the search will be expanded'.
- b. **Detailed Roles and Tasks**—Each team will be given all the relevant instructions required so that the team may perform the allocated tasks:
 - a. **Role**—A general statement is required. eg. 'Team One will be searching the area marked A on the map'.
 - b. **Tasks**—This should be used only where there is a requirement for a team to perform other tasks not described under its role; eg. 'Team One, in addition

to searching your allocated area, you will act as a radio relay between other search teams and this headquarters as required’.

- c. **Method**—It may be necessary to explain how the role will be performed; eg. ‘Team One, it is suggested that the creeping line ahead search method would prove suitable. Commence at the junction of the road and wire fence at (grid reference, and/or description), search to the north so as to finish at this point (grid reference and/or description). Pay particular attention to any heavy cover or heavily-grassed areas, make sure the boundaries of each sweep are clearly marked’.
- d. **Boundaries**—If boundaries are to be employed by search teams, they must either:
 - a be clearly defined physical features (roads, fences, power lines); or
 - b be marked by the teams as they progress.
- e. **Special Equipment**—This will apply to special items allocated to specific teams, (details of equipment common to all should be detailed under the administration and logistics heading).
- f. **Co-ordinating Instructions**—These are the details common to all teams by which the Field Search Controller maintains control of the operation:
 - a All timings should be given in this block. If the operation is to proceed by phases or teams are to commence their tasks at differing times, this is where such timing should be specified.
 - b Movement/Navigation Details:
 - i to and from start/finish point;
 - ii what routes will be employed;
 - iii what method of transport will be employed (by foot, vehicle, aircraft, etc.); and
 - iv any specialised transport arrangements such as helicopter, to include landing and pick up zones.
- g. **Action If.....:**
 - a the operation is terminated before the planned finish time;
 - b the person is found uninjured;
 - c the person is found injured;
 - d the person is found dead;
 - e a team member becomes injured; or
 - f a team member becomes lost.
- h. **Medical Casualty Evacuation**—This details the procedure to be adopted for both team members and the missing person(s).

5.163. Administration and Logistics (What support will be provided and how): The following should be considered under this heading:

- a. **Food and Water**—If a meal will be provided before commencement (where and when). If water is to be carried by participants, how long it will be required to last.
- b. **Re-supply**—If re-supply of food, water or equipment in the field is planned, what the arrangements will be.
- c. **Dress and Equipment**—Directed initially at the individual member, then for the team (team items include first aid kits, stretchers, maps, compasses or any other equipment to be carried within the team).

5.164. Command and Communications (Who will be in control and how the communications will function): The following should be considered under this heading:

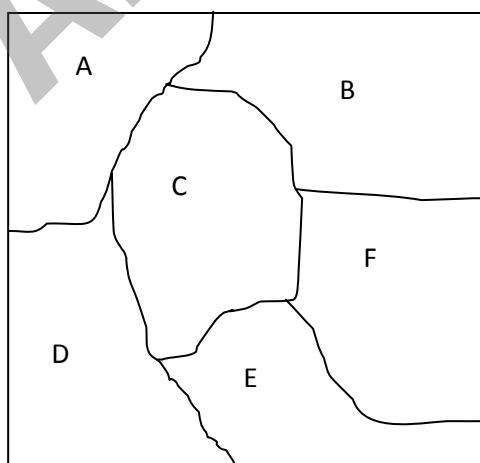
- a. Where the headquarters is located.
- b. Who is in charge of specific tasks and command structure.
- c. Communications:
 - i radio net diagram;
 - ii type of radio to be employed;

- iii primary and secondary frequencies;
- iv call signs;
- v radio net establishment times;
- vi situation reports/radio schedule times;
- vii code words (if situation requires);
- viii method of notifying the conclusion of, or change to operation; and
- ix synchronisation of watches.

Other methods of communicating in the field apart from radios may be employed. No matter what system is selected, all details must be given to ensure the effective functioning of the system.

- 5.165. Issuing orders:** At the conclusion of a briefing, those persons required to be issued with orders should be directed to remain whilst others are released to continue with preparations. To ensure that orders are presented in a logical, detailed manner:
- a. utilise the SMEAC system;
 - b. read from prepared, sequentially-numbered pages;
 - c. present the orders at a speed which enables attendees to write down pertinent information; and
 - d. repeat the mission and all grid references to ensure clarity.
- 5.166. Synchronisation of watches:** This should occur before taking questions.
- 5.167. Questions from the teams:** To maintain control, it should be indicated that questions will be taken after a nominated period, (eg. 5 minutes). Then, the briefing officer should ask each Team Leader in turn, if there are any questions and then provide the answers.
- 5.168. Questions to the teams:** Check that the briefing has been assimilated by directing questions to the Team Leaders about roles, tasks, boundaries, timings, call signs and other relevant information. The briefing officer should then indicate that the briefing has concluded and all participants may carry out their allotted tasks. Time should be allowed for Team Leaders to conduct a briefing of their team prior to commencing the search.
- 5.169. Code Word:** A code word, to be employed in the event that the person is found and believed to be dead, should be given. This will notify the SMC immediately of the situation and should be followed by the location of the team.
- 5.170. Action on locating the missing person(s):** Prior to the deployment of search teams, the action to be taken in the event of a team locating the person must be defined and clearly understood by all searchers. This action must form part of the briefing to search teams. The suggested action to be taken where a person is found dead is as follows:
- a. The searcher locating the missing person immediately informs the Team Leader who will make an assessment.
 - b. In the event that the person is believed to be dead, the Team Leader will ensure minimal disturbance of the immediate scene by instructing all members of the team to remain clear of that person, to a distance of approximately 30 metres. If possible the area should be marked off with tape or rope.
 - c. Only the Team Leader and a First Aid Qualified person will approach the body to check for pulse and breathing. It is essential that two people check the body to prevent mistakes.
 - d. In the event the person is alive all medical assistance possible will be given.
 - e. If the person is deceased, the finder and Team Leader will retrace their steps and maintain the cordon. All deceased persons and their locations are to be treated as Crime Scenes until advised otherwise by an investigating police officer.

- f. As soon as practicable, the SMC and/or Field Headquarters should be informed using the assigned code word and arrangements made for the Police to attend that location.
 - g. The team will maintain the security of the scene until relieved.
- 5.171.** It must be remembered that information transmitted through the radio network may be heard by many people including the media, relatives and friends of the missing person. Some of these people may already be in a distressed state and will be sensitive to any thoughtless comments on the condition of the missing person. Therefore, it is important that all searchers use the designated code word and think before passing their assessment on any person's condition through the radio network.
- 5.172.** It is also worth considering the use of a code word in the event that the missing person is found and is seriously injured.
- 5.173. Mattson Consensus:** Determining which segments to search when there are not enough resources to cover the entire search can be daunting for any SMC, especially when there is pressure to get the job done. One aid that can spread the burden of this is the Mattson Consensus, although the ultimate responsibility will always rest with the SMC. The search area is divided into smaller search segments with each being given a letter or number. This letter or number is entered into the 'Search area' column of the table. The SMC then chooses a number of trustworthy persons, such as the SES Controller, a knowledgeable local, Park ranger etc, who then look at the various search segments. Each person independently determines the probability of the target being in each of the segments. There is always one extra segment, called 'The Rest of the World' or ROW which covers everywhere outside the search area.
- 5.174.** Each of the people assign a number value to each segment with the highest value going the segment they believe the target has the greatest chance of being located in. There is no total value for this exercise. Adding across the table you arrive at the total for each of the search segments. Working out the percentage you can see that area C has the highest with a consensus of a 0.23 chance that the target will be in that area, with area B coming in second at 0.19. Area F and ROW are the least likely areas according to the consensus.
- 5.175.** The SMC can now allocate resources according to the priorities as in the consensus, or can ignore it and go their own way.



Search areas given letter for Consensus.

	A	B	C	D	E	F	ROW	Total points
SMC	10	20	20	10	20	10	5	95
A/SMC	15	20	30	10	15	10	5	105
Local Cont	20	20	25	15	20	10	5	115
Total per area	45	60	75	35	55	30	15	315
Divided by total points	45/315	60/315	75/315	35/315	55/315	30/315	15/315	315/315
Percentage	14%	19%	23%	11%	17%	9%	4%	100%

Consensus Worksheet

Archived

Chapter Six – Rescue Planning and Operations

- 6.01. General:** The primary purpose of any SAR action is the speedy return to a place of safety of the survivors of a distress situation.
- 6.02.** When planning and conducting SAR operations the safety of the search party members is also paramount. Safety is an essential aspect of every search operation, and as such, all participants have a responsibility. It includes such factors as adequate and appropriate equipment and clothing, proper preparation of team members and skilled leadership.
- 6.03.** It is essential that from the start of any SAR action, the SMC plans for the rescue of survivors and ensures that the appropriate resources are alerted, briefed and positioned so that the rescue may take place with the minimum of delay after the location of the survivors.
- 6.04.** Without jeopardising the ultimate safety of survivors, foremost consideration shall be given to the potential impact on any medical condition of survivors by the method of recovery or the actions of unqualified persons.
- 6.05.** The method of rescue to be used shall be decided after consideration of all relevant factors including:
- a. action taken by locating team and the action that can be taken by other teams at the scene;
 - b. location of the survivors;
 - c. condition of survivors and medical considerations;
 - e. environmental considerations;
 - f. available SAR facilities and their state of readiness;
 - g. effect of weather;
 - h. time of day;
 - i. any risks involved to SAR personnel at a scene e.g. dangerous goods, hazardous materials.
- 6.06.** To reduce delay, the SAR facilities that are likely to be used should be alerted and deployed to a suitable location while the search is still in progress.
- 6.07. Preparation:** It is the responsibility of the SMC to ensure that appropriate rescue resources are brought to a state of readiness and, as necessary, strategically positioned to be moved quickly into action immediately survivors are located.
- 6.08.** The SMC shall ensure that proper attention is given to the preparation and execution of the rescue effort.
- 6.09. Medical assistance:** It must be assumed that the survivors of an emergency will be in need of medical attention, and arrangements should be made to include medically qualified persons in the rescue team.
- 6.10. First Aid:** Although many crashed aircraft or vehicles are located by helicopter it is not always possible to lower a paramedic or doctor to the scene. In other instances it will be a land search team who locates and arrives on scene first. In either instance it is vital that all land search teams contain one or more persons with a good knowledge for first aid and have a well stocked first aid bag. First aid will most often be limited to immobilising broken bones, stemming blood loss and making the patient comfortable. CPR will not be required if it has been some time since the incident, unless the MP or victims suffer a problem in the presence of the search team. Although the actual first aid provided may be limited, the psychological value can not be underestimated.
- 6.11. Land rescue for missing persons, crashed aircraft or vehicles:** Although the location of the missing person, aircraft or vehicle may be known, it may be extremely difficult for a rescue team to reach it. Therefore the operation should be undertaken only after proper and complete planning.

- 6.12. The rescue team should be taken to a locality as near as possible to the location by some means of rapid transport. If access to the site is possible, an aerial survey of the site may be made to determine the best route. The equipment carried should be carefully selected and arrangements made for supplies to be dropped should re-equipment be necessary.
- 6.13. The SMC will determine equipment necessary for rescue teams, in consultation with rescue experts. A portable radio capable of communicating with other SAR Units should always be included in a rescue team's equipment.
- 6.14. In cases where all occupants of a crashed aircraft or vehicle are not immediately accounted for, the search for missing persons must be continued. In the meantime, activities for the rescue of the others should be started.
- 6.15. Advice to police officers, other emergency services personnel and the public of the necessary actions to be taken in the event of a civilian aircraft crash in their area is obtained from the ATSB publication, *Civil and Military Aircraft Accident Procedures for Police Officers and Emergency Personnel*
- 6.16. The rescue team should make a report to the SMC as soon as possible. The SMC will relay advice of the condition of persons and disposition of wreckage to other authorities as appropriate.
- 6.17. Aircraft and vehicle wreckage should not be disturbed except to assist in the recovery of survivors. Not only may the wreckage pose dangers by way of toxic materials and fumes, but also the position of flight controls, the location of debris and other factors are important to the accident investigation.
- 6.18. Survivors should be removed from the location and transported to receiving medical facilities by the most expeditious means. When selecting the method of transport, the SMC should consider:
 - a. the condition of survivors;
 - b. the capability of the rescue team(s) to reach the survivors in the shortest possible time;
 - c. the medical training, qualifications and operational abilities of the rescue personnel;
 - d. the rescue teams' capability to transport survivors without aggravating injuries or producing new complications;
 - e. the difficulties that may be encountered by rescue teams, e.g. provision of shelter;
 - f. the need for food and water;
 - g. the weather conditions; and
 - h. methods of maintaining communication with the rescue team, either directly or indirectly.
- 6.19. Evacuation of survivors will be relatively simple if they are located in an area where medical and rescue facilities are available locally and from where aerial, road or water transport is possible. However, if the distress site is in a difficult or inaccessible area, the evacuation will have to be made on foot to a place from where transport can be provided. This may require sufficient foliage to be cleared by the land party to allow helicopter operation into the site.
- 6.20. If it is considered necessary to move survivors via an overland route the SMC is to be advised so that further assistance can be arranged.
- 6.21. If it is decided to evacuate the survivors by air, the rescue team may provide advice of a suitable landing area for fixed wing aircraft or a landing or hovering site for a helicopter. If verbal communication is not possible, the land party should prepare the appropriate ground/air visual signals.
- 6.22. ATSB and police should be given early notification of a crash for a decision for their attendance at the crash site.

- 6.23. Next of kin should be kept fully informed through the appropriate liaison channel; normally the police
- 6.24. Pending assumption of the responsibility by ATSB or relevant ADF authority, the SMC, through local police, shall endeavour to arrange security at the crash site to prevent interference with the wreckage or with marks made by the aircraft in landing. State and Territory police are responsible for securing the accident scene. Instructions for police officers and emergency services personnel can be found in the ATSB handbook: *Civil and Military Aircraft Accident Procedures for Police Officers and Emergency Personnel*
- 6.25. **Accidents and injuries to rescue personnel:** In the event of an accident or injury to rescue personnel (either on roads or in the field), it is the team leader's responsibility to report the incident to the SMC, and to decide on the appropriate course of action.
- 6.26. **Avoidance of Danger:** All members have a responsibility for safety. In the event of a dangerous situation developing, all activity must cease until the problem is resolved.
- 6.27. Personal injury from unsafe practices is a threat to searchers and may jeopardise the operation. Training programs must include lectures and information on safety, hazardous situations and hazardous materials.
- 6.28. Night search training should be carried out in safe areas, with checks made beforehand as to the extent of hazards in the training area.
- 6.29. Operational Safety: The team leader must keep a firm control of the team, ensuring:
- A written list is carried and frequent checks are made to confirm all personnel are accounted for.
 - Members are aware of the search orders.
 - All personnel are aware of field signals.
 - members are observant and always maintain contact with their team.
 - The capabilities and pace of all members is considered; and
 - That appropriate care is taken, having regard to the prevailing conditions.
- 6.30. In the interests of safety, all team members must obey orders given to them by the team leader.
- 6.31. **Health hazards - aircraft accidents:** Movement in the vicinity of crash sites can be extremely hazardous for ground parties on account of toxic fumes, dangerous substances and explosives. Deaths have resulted from ground personnel breathing noxious air and contacting extremely poisonous substances in the proximity of wrecked aircraft.
- 6.32. Personnel should refer to the ATSB handbook for more detailed procedures and precautions to be taken.
- 6.33. To the extent that it can be governed, the SMC shall advise that permission should be secured from the appropriate ADF authority before members of the public or other agencies approach a crash site of a service aircraft.
- 6.34. Modern aircraft use composite materials for some of their structure, skin, and access panels. Significant health hazards exist at crash sites from the effects of crash damage and fire on composite materials. When burnt, released fibres and resins may be toxic through inhalation and/or skin and eye contact. Damaged composites may also produce needle-like edges that render handling hazardous. Carbon fibres are electrically conductive and may short-circuit nearby electrical equipment.
- 6.35. Certain exotic metals (radioactive substances) can also be found in ADF aircraft types, which are also poisonous in their own right. The inhalation, ingestion or absorption of radioactive substances is hazardous, as low-level radiation will continue to be emitted inside the body, possibly resulting in damage to surrounding tissues and organs.
- 6.36. ATSB and CASA officers and police shall be given reasonable access to SAR facilities and staff during salvage operations.

- 6.37. Use of aircraft for rescue:** When considering the use of aircraft to bring about the recovery of survivors, care must be taken to ensure that the rescue aircraft and crew are not exposed to inordinate danger
- 6.38.** Fixed wing aircraft should only be used to retrieve survivors when there is significant advantage over the use of surface transport and when there is a suitable aerodrome or landing area near the scene. Pilots shall be discouraged from attempting to land at other than prepared landing areas to pick up survivors. However, should this prove to be the best or only viable option, all available specialist advice concerning the operation shall be obtained. It may be possible to have a qualified person lowered or parachuted in to survey the area. Helicopters may be employed to shuttle survivors from a distress site to a suitable fixed-wing landing area.
- 6.39. Use of helicopters for rescue:** When available, helicopters should be considered for rescue work. While eminently suited to the task in many respects, helicopters do have specific limitations that may be summarised as:
- a. the adverse effects of turbulence;
 - b. the need for a level, or near level, landing area;
 - c. a requirement for a cleared landing area of specific dimensions to avoid rotor blade damage;
 - d. a requirement for safe approach and take-off paths;
 - e. potential for adverse effects on certain serious injuries;
 - f. limited endurance;
 - g. inability to hover with loads at high altitudes;
 - h. limited accommodation.
- 6.40.** Helicopters can be used to rescue survivors by winching or by landing at a suitable location. Owing to their unique flying characteristics, helicopters should be considered for use as a rescue unit as a matter of course.
- 6.41.** They are particularly suitable for rescues at locations where surface units are unable to operate. At the same time, some helicopter evacuations may be hazardous, particularly in mountainous areas at high altitudes and over rough seas. Such evacuations should therefore only be carried out by specially qualified and experienced crews and then only in the event of serious injury or illness or when lack of other means of rescue might result in loss of life. It is important that any information on the condition of survivors is considered by specialists before committing to helicopter use.
- 6.42.** Operations by rescue teams may be hampered by the noise and rotor wash produced by helicopters. To avoid damage to rotor blades, the landing site should be cleared to a diameter specified by the pilot-in-command for each proposed operation.
- 6.43.** The helicopter's mass may be a factor limiting the number of survivors that may be taken aboard each trip. It may, therefore, be necessary to reduce weight by all possible means, e.g. removal of non-essential equipment, minimum fuel, use of advance bases with fuelling capabilities, etc.
- 6.44.** It must be ensured that the route followed by the helicopter as well as the location where the survivors are to disembark are known to the SMC.
- 6.45.** A medically qualified person, medical equipment and respiratory equipment, when available, should be carried on a helicopter recovery mission, at least on the first flight to the distress scene.
- 6.46.** Survivors may not know how to operate a strop. A two-person winch is preferred to a single winch. A double strop allows one rescuer to supervise while being winched down and up again with each survivor. **Note:** *A helicopter should not be approached unless directed*

and/or escorted by a member of the helicopter's crew. Helicopters may require approach from different aspects dependant on type.

- 6.47. Use of top cover aircraft with rescue and MEDEVAC helicopters:** The provision of a top cover aircraft should be considered during operations that may expose the helicopter to undue risk.
- 6.48.** The SMC is to discuss the requirement for a top cover aircraft with pilot in command of the helicopter. The decision to task a top cover aircraft can be made by the SMC alone or on request by the pilot in command.
- 6.49.** Circumstances that may require the provision of a top cover aircraft may include:
- helicopters operating over water. This will vary with the type of helicopter involved. If in doubt, consult with the crew.
 - helicopters operating at or near the limit of their endurance
 - helicopters operating in poor or marginal weather conditions
 - helicopters operating at a rescue scene presenting special dangers, e.g. night.
- 6.50.** Aircraft tasked for top cover should be a SRU aircraft carrying suitable supply drop equipment. The primary tasks of the top cover aircraft will be to:
- provide navigation assistance to the helicopter to locate the target;
 - provide communications assistance to the helicopter; and
 - provide immediate assistance by way of supply drop should the helicopter ditch.
- 6.51. Supply dropping and delivery of survival equipment:** Situations will arise where the immediate recovery of survivors is not possible and arrangements will have to be made to deliver sustenance, medical and survival equipment. Such situations shall be anticipated and planned for by the SMC during the conduct of a search.
- 6.52.** Where possible delivery will be by way of helicopter or aircraft. An example of this would be a situation with seriously injured survivors who may need stabilising prior to being moved, or where persons are located in a remote area by a fixed wing aircraft and a helicopter or vehicle is some distance or time away.
- 6.53. Civil SAR equipment:** The inventory of Civil SAR Equipment suitable for land incidents provided by RCC includes:
- Target marking devices including See-Blitz strobe lights
 - Heliboxes for the supply of sustenance, medical and survival equipment
 - EPIRBs.
 - Precision Aerial Delivery System (PADS) for the delivery of a single liferaft, storpedo or pump.
 - Search and Rescue Communicators (SARCOM) emergency AM radios operating on the aviation band of 123.1MHz that are suitable for dropping in Heliboxes or storpedos.
- 6.54.** RCC staff are familiar with the type and disposition of Civil and ADF SAR equipment and its usage and can be contacted for advice. Detailed procedures and instructions relating to the operation and delivery of the equipment are incorporated in the Search and Rescue Manual for SAR Unit Pilots and Dropmasters that can be obtained from the SAR Resources and Training section of AMSA.
- 6.55.** Only suitably qualified, trained and equipped crews shall be tasked for supply dropping.
- 6.56.** Aircraft tasked for supply dropping will be suitable for the purpose. It is the aircraft operator's responsibility to ensure the appropriate flight manual supplements / flight manual limitations and dispensations are held. Routinely such dispensations will be against:
- Civil Aviation Act Section 23 (Carriage of Dangerous Goods)

- b. Civil Aviation Regulations 175(3) (IFR Flight)
 - c. Civil Aviation Orders 29.5 (Dropping of articles from aircraft)
- 6.57.** Specifically, dropping of articles from aircraft at night requires the approval of CASA (CAO 29.5 paragraph 7).
- 6.58. Supply drop from aircraft over land:** Where it may take too long to get to survivors by land, stores and equipment can be dropped from civil or ADF aircraft. The main method of delivering supplies to survivors on land from aircraft is by Helibox or Storpado that can contain food, water, blankets, radios and medical equipment. In situations where it is important to provide survivors with shelter, it may be appropriate to drop one or more liferafts. Where there is no suitable landing place close to the survivors, vital survival equipment, food and stores could be winched or dropped from a helicopter with great accuracy.
- 6.59. Training Safety:** It is desirable that all members be trained in essential skills and be physically capable of undertaking the activity. Training must include all safety factors. With experience, searchers will develop 'safety sense'. How they train is how they will perform. Breaches of safety must never be tolerated.

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Chapter Seven – Conclusion of SAR Operations

- 7.01. General:** SAR Operations enter the conclusion stage when:
- a. the target is located and the survivors are rescued;
 - b. the emergency beacon has been located and the survivors rescued, or if there was no distress, the beacon has been turned off;
 - c. information is received that the target is no longer in distress;
 - d. all known persons on board the aircraft or vehicle are accounted for, or it has been determined that there is no longer a chance of survival; or
 - e. the SAR Authority determines that further searching has no significant chance of succeeding and suspends the search.
- 7.02.** The authority to end a search rests with different levels within the SAR organisation, depending on the circumstances. In particular, the SAR Authority is responsible for deciding when to suspend an unsuccessful search where lives were known to be at risk.
- 7.03.** The SAR Authority may delegate to the SMC the authority to conclude the operation in all other circumstances (ie: when the SMC determines that the target is no longer in distress and in situations where an identified beacon has ceased transmitting).
- 7.04. Conclusion of a successful SAR action:** When the target of a search action has been located and the survivors removed to a place of safety, the SMC shall ensure:
- a. all people and organisations involved in the SAR action are stood down;
 - b. all appropriate agencies are notified;
 - c. next of kin are fully informed;
 - d. arrangements are made for the recovery of dropped survival equipment eg rafts;
 - e. the collection all maps, worksheets, notes, messages in chronological order and file on a SAR incident file; and
 - f. that administrative and financial procedures are completed.
- 7.05. Suspension of a search when the target is not found:** When it is determined that further search would be of no avail, the SMC shall consider recommending the suspension of the SAR operation. However, search action shall not be suspended nor the distress phase cancelled without the specific concurrence of the SAR Authority.
- 7.06.** The decision to suspend a search shall not be made until a thorough review of the search is conducted. The review will focus on the probability of there being survivors from the initial incident, the probability of survival after the incident, the probability that the survivors were in the search area, and the effectiveness of the search.
- 7.07.** The review should:
- a. examine search decisions to ensure that proper assumptions were made and that planning scenarios were reasonable;
 - b. reconfirm the certainty of the LKP
 - c. re-evaluate any significant clues and leads;
 - d. confirm that all reasonable means of obtaining information about the target have been exhausted;
 - e. review all intelligence material to ensure no information had been overlooked;
 - f. examine the search plan to ensure that:
 - i. assigned areas were searched;
 - ii. the probability of detection was as high as desired; and

- iii. compensation was made for search degradation caused by weather, navigational, mechanical or other difficulties; and
 - g. consider the survivability of the survivor/s taking into account:
 - i. time elapsed since the incident;
 - ii. environmental conditions;
 - iii. age, experience and physical condition of (potential) survivors;
 - iv. survival equipment available;
 - v. studies or information relating to survival in similar circumstances; and
 - h. consider the rescue plan to ensure that:
 - i. best use was made of available resources;
 - ii. contingency plans were sufficient to cater with unexpected developments; and
 - iii. coordination with other agencies was effective in ensuring best treatment of survivors.
- 7.08.** Before an unsuccessful search is suspended, the SAR Authority shall make arrangements to ensure that the next of kin are fully briefed on the complete search effort, including conditions in the search area, other salient operational factors and the reasons for proposing the suspension of the search.
- 7.09.** Consideration may be given to notifying the decision to suspend search effort at least one day prior to suspension of operations allowing next of kin at least one more day of hope while giving them time to accept that the search cannot continue indefinitely. Accordingly, the SMC should maintain regular contact with the relatives during the conduct of the search, providing access to the FSH if practical and appropriate.
- 7.10.** In a case where foreign nationals are involved, liaison shall occur with the Department of Foreign Affairs and Trade.
- 7.11.** The reasons for suspending a search shall be clearly recorded.
- 7.12.** When a SAR action is discontinued or a search is suspended, the SMC shall inform all authorities, units and facilities that have been activated and/or alerted.
- 7.13.** On occasions, after the suspension of a search, it may be necessary for the Police or Defence to continue to search for bodies and/or aircraft/vessel wreckage. In such cases the SAR Authority that had responsibility for the coordination of the search and rescue operation may, where possible:
 - a. provide briefings on the intentions/path of the person/vehicle/aircraft prior to disappearance, last known position, area searched and related intelligence;
 - b. review intelligence to assist search;
 - c. source aircraft for transport or search purposes
- 7.14.** Should any other organisation such as the family or operating company, wish to continue with or initiate an independent search, the SAR Authority that had responsibility for the coordination of the search and rescue operation should ascertain whether there is any new intelligence that provides grounds to resume or continue the search. Under the circumstances where there is new intelligence, it should be evaluated and if considered valid the search should be continued or resumed. Where there is no new intelligence, then the SAR Authority may assist the requesting organisation by:
 - a. briefing the person/vehicle/aircraft's path prior to disappearance, LKP/crash point, area searched and related intelligence;
 - b. advising the possible location of suitable search aircraft
- 7.15** **Reopening a suspended search:** If significant new information or clues are developed, reopening of a suspended case should be considered. Reopening without good reason may lead to unwarranted use of resources, risk of injury to searchers, possible inability to respond to other emergencies, and false hopes among relatives.

- 7.16. Records and reports:** Records relating to search and rescue operations shall be retained for periods as required under the relevant legislation and regulation.
- 7.17.** When a search has been suspended without locating a missing person, vehicle, aircraft or their occupants, all records, charts etc. shall be retained and be accessible to SAR staff to allow easy resumption of search activity should further intelligence be received.
- 7.18.** Reports on SAR Actions shall be generated as required for Coroners Inquiries, Management purposes and for training requirements.
- 7.19. Incident debriefs:** Following an incident holding a debrief of agencies and groups involved should be considered. The purpose of incident debriefs is to establish opportunities for improvement in the operation of the national SAR system.
- 7.20** Incidents worthy of debrief may include those where:
- lives have been lost unexpectedly;
 - large and complex searches have been conducted;
 - multi agency involvement occurred; or
 - where coordination, communication or response challenges were experienced during the incident.
- 7.21.** This list is not exhaustive and the conduct of a post incident, multi-agency debrief is at the discretion of the SAR Authority in overall coordination of the incident with mutual agreement of other SAR Authorities and agencies involved.
- 7.22.** Post incident debriefs should be used to;
- establish opportunities for improvement in the operation of the National SAR System; and
 - ensure current policies and procedures are appropriate.
- 7.23.** The SAR Authority with overall coordination is to:
- decide the need for a debrief in consultation with other SAR participants;
 - organize and host the debrief unless otherwise agreed by the participants;
 - establish a venue that maximizes opportunity for participation in, and learning from, the debrief;
 - capture and share the opportunities for improvement arising;
 - initiate changes to the National SAR Manual as appropriate arising from the debrief; and
 - include lessons learned from debriefs in their jurisdiction reports to the annual National SAR Council meeting.
- 7.24.** No matter how simple or complex the operation may be, it cannot be concluded until a debrief has been conducted.
- 7.25.** This is the primary method employed to assess the effectiveness of the plan, and for Team Leaders to assess their own conduct.
- 7.26.** Depending on the size of the activity and/or the number of participants, there may be different types of debriefings:
- At the end of each phase of the operation. This is to update information and revise plans for subsequent phases.
 - By the leaders of individual teams to determine the effectiveness of their training and/or operating procedure and the conduct of their allotted tasks.
 - A debrief by the Controller of everyone involved in the conduct of the operation prior to the conclusion.
 - After the initial information has been analysed and the control element has had time to study all the records and data relevant to the activity.
- 7.27.** Provided the debrief is conducted correctly, many valuable lessons may be learnt which may be applied to the conduct of the immediate operation and may be incorporated into future plans and procedures. A poorly conducted debrief may not only fail to achieve its aim, but also have negative effect on those participating.

- 7.28. Conducting the Debrief:** The points discussed in briefing are just as relevant in debriefing. However, the debriefing officer needs to do the following:
- a. Control the debrief and not allow it to degenerate into a witch hunt.
 - b. Stress that the aim of the debrief is to examine the operation to determine what went right, what went wrong, and why?
 - c. Address specific questions, such as:
 - (1) accuracy of maps,
 - (2) terrain,
 - (3) suitability of search method,
 - (4) effectiveness of communication system,
 - (5) resupply, and
 - (6) any other related subjects.
 - d. Identify good points and make special mention of them. People prefer to be praised rather than criticised. No matter how often it is stressed that the debrief is not a witch hunt, somebody will believe that they are being criticised, either personally or on behalf of the organisation they represent. Be aware that this will occur.
 - e. Seek comments from the those being debriefed. Once the major points have been identified, ask for any comments. Maintain control by employing the same system as that used during the briefing. Stress that the information being sought is constructive criticism that will be employed to improve the conduct of operation in the future.
 - f. Take written notes. Not only does this ensure that all points are recorded for future use, it will also allow those being debriefed to observe that a genuine effort has been made. Further comments may not be forthcoming unless it is noted that relevant points are recorded.
 - g. Read out a summary of the points discussed to confirm that they have all been addressed.
 - h. Issue confirmatory notes to all organisations detailing all points discussed and what actions need to be taken.
- 7.29.** Participation at debriefs may be restricted to particular SAR Authorities and agencies depending on the issues that are likely to arise and would be a decision for the SAR Authority with overall coordination for the incident.
- 7.30.** SAR Authorities that participate in the debrief will meet their own attendance costs, unless otherwise agreed by the participants.
- 7.31.** The debrief should include the opportunity for all significant parties involved in the incident to contribute and learn from it.
- 7.32. Case studies:** Case studies may be conducted at the direction of the SAR Authority. IAMSAR provides guidance on case studies as follows.
- 7.33.** Sometimes a SAR case has a surprise ending, as when the survivors are found by someone not involved in the search effort in a location outside the search area, or they are found, alive and well, in the search area after the search effort has been suspended. There are also occasions when there seems to have been an unusual number of problems in spite of the best efforts of the SAR personnel. Finally, there may be important and valuable lessons to learn from a SAR incident and the subsequent response of the SAR system that would be revealed only by a careful after-the-fact review.
- a. A SAR case study is an appropriate method for addressing those aspects of an incident that are of particular interest. Individual aspects of interest could include problems with communications, assumptions made, scenario development, search planning, or co-ordination. SAR case studies or incident reviews also provide opportunities to analyse survivor experiences and lifesaving equipment performance. Survival in hostile environments is affected by many variables, including the physical condition of the

survivors, survivor actions, support provided by rescuers prior to rescue, and the effectiveness of safety or survival equipment. Knowing more about these factors can help the SAR system become more effective.

- b. When used to review and evaluate all aspects of a response to an incident, SAR case studies are one of the most valuable and effective tools for improving SAR system performance. Therefore, SAR case studies or reviews should be performed periodically even when no problems are apparent. There is almost always room for improvement, especially in large, complex cases. The most important outcome, however, is that early detection and correction of apparently small problems or potential problems will prevent them from growing into serious deficiencies later.
- 7.34.** To get a balanced view, more than one person should conduct SAR case studies; the case study team should include recognized experts in those aspects of the case being reviewed. To achieve maximum effectiveness, case studies should not assign blame, but rather, should make constructive suggestions for change where analysis shows that such change will improve future performance.
- 7.35. Performance improvement:** Constant improvement in the performance of the SAR system should be a clearly stated goal of SAR managers. One method to encourage performance improvement is to set up goals whose degree of attainment can be measured by key performance data. This data should be collected, analysed, and published on a routine basis so that individuals can see how the system as a whole is doing, and how their performance is contributing to the achievement of the established goals. Routine reports from the SMC's to the SAR managers can be used for monitoring system performance and highlighting areas where improvement is possible through changes in policies, procedures, or resource allocation.

Chapter Eight – Training & Exercises

- 8.01. General:** The importance of thorough training for all personnel employed on SAR missions cannot be over-emphasised. Failure of a single link in the often complex chain of action required in SAR missions can compromise the success of the operation, resulting in loss of lives that might otherwise have been saved. The purpose of training is to meet SAR system objectives by developing SAR specialists. Since considerable experience and judgement are needed to handle SAR situations, necessary skills require significant time to master. Training can be expensive but contributes to operational effectiveness. Quality of performance will match the quality of training.
- 8.02. Professionalism:** Consistency in training and sharing of information relating to search and rescue is promoted through the National Amendment and Training sub-committee and the National SAR Council. Standardisation to the prosecution of SAR Operations is encouraged through these forums.
- 8.03.** Efforts to ensure professionalism extend to career development for individuals who are assigned to undertake SAR duties. The aim is to ensure SAR officers are competent. In additions, agencies should consider making appointments of sufficient length to develop expertise and take advantage of SAR experience in subsequent appointment of officers.
- 8.04. Who to train:** All personnel involved in SAR Operation need to undertake SAR-specific training. Specialist team training may also be required. Where there is a requirement for multi-agency response, teams should be exercised in such a manner that each team and each team member understands the role that they play in support of the incident.
- 8.05. Requirement for training:** Training is critical to performance and safety. The SAR system should save those in distress when it can, and also use training to reduce risks to its own valuable personnel and facilities. Training personnel in making sound risk assessment will help to ensure that these trained professionals and valuable facilities remain available for future operations.
- 8.06.** Search and rescue organisations are responsible for the establishment of training programs for SAR personnel to reach and maintain competence appropriate to their role.
- 8.07.** Training of SAR personnel should focus on both the practical and theoretical application of SAR and can include the following:
- a. Study of SAR procedures, techniques and equipment through lectures, demonstrations, films, SAR manuals and journals;
 - b. Assisting in or observing actual operations; and
 - c. Exercises in which personnel are trained to coordinate individual procedures and techniques, or operate specialised equipment, in an actual or simulated environment.
- 8.08. Public Safety Training Package:** The Public Safety Training Package has been developed though extensive consultation involving all Australian SAR authorities. The qualifications contained within the package are consistent with Australian Qualifications Framework (AQF) guidelines and are endorsed by the Australian National Training Authority (ANTA).
- 8.09.** The Public Safety Training Package provides units of competence and qualifications that identify core competency standards for personnel who are involved in SAR activities. Units of competence have been packaged and aligned to a specific qualification within the AQF to establish the qualification level and title.
- 8.10 National Search and Rescue School:** The National SAR School, a Registered Training Organisation (RTO), is the training arm of RCC Australia.

- 8.11. The National Search and Rescue School provides specialist aviation and maritime search and rescue training to officers primarily in Australia's Rescue Coordination Centre (RCC). In addition, the School provides SAR training to Australian and International Defence Forces, Police personnel, and search and rescue staff in neighbouring countries.
- 8.12. The National Search and Rescue School is the RTO and provides support for the Advanced Diploma of Public Safety (Police Search and Rescue Management) course held annually at the Australian Federal Police College, Canberra.
- 8.13. Directing staff of the National Police Search and Rescue Managers Course, in addition to instructors from the National Search and Rescue School, are drawn from Australian police organisations. These officers are subject matter experts in land and marine search and rescue and are qualified in workplace training and assessment.
- 8.14. **State/Territory SAR Authority Training:** In addition to participating in the National Police SAR Managers training program the State/Territory Police organisations in Australia conduct search and rescue specific training with personnel involved, or who may become involved, in SAR operations at a local level.
- 8.15. This training involves principally land and coastal search and rescue operations employing their own personnel and personnel from other State/Territory organisations having a role in local search and rescue missions.
- 8.16. Formal training in the Diploma of Public Safety (Police Search and Rescue Coordination) is conducted by a number of registered training organisations associated with the Australian Police Services.
- 8.17. Ongoing training and the upkeep of SAR skills has been identified as a problem affecting all SAR Authorities. Each authority is responsible for maintaining a program that ensures SAR skills and knowledge are kept at a high level. It has been identified that merely coordinating SAR incidents does not constitute skills maintenance as coordinators slowly become complaisant and take short cuts. Good results may be often due to luck rather than good planning. Various Coroners' Courts have identified many SAR incidents that have failed due to poor or non existent planning. Regular training exercises and practical tests that encourage the use of correct methods should be undertaken on an annual or biannual basis.
- 8.18. **Search and Rescue Exercises:** Each State/Territory Police Service should periodically take part in coordinated search and rescue exercises (SAREX). These SAREX's should be designed to exercise the SAR system, in whole or part, and test such things as operational plans, communication procedures and facilities, individual staff performance, SAR unit performance and inter-organisation and/or international operations.
- 8.19. It is equally important that personnel have a good knowledge of the duties and procedures of other units and person who may be involved in a SAR operation, particularly those with whom they will have direct contact. It is especially important that SMC's be aware of the time, effort, and risk involved when requests are made to other units or organisations.
- 8.20. Liaison visits between personnel likely to become involved together in SAR operations are encouraged. SMC's and SAR personnel should visit other SAR units or RCC's to become familiar with their facilities and capabilities and when possible take part in training exercises.
- 8.21. The regular conduct of joint SAREX's between SAR Authorities should form a part of any training program.
- 8.22. Emergency Management Australia (EMA) has developed a handbook, *Managing Exercises* that should be used as a guide and to assist SAR personnel designing and conducting search and rescue exercises.

- 8.23. Training of SAR Units:** As the responsibility for land search, as defined in the National SAR Plan, is that of the State/Territory Police organisations, with assistance from members of the State and Territory Emergency Services, land SAR training is generally conducted by those organisations.
- 8.24.** Other SAR authorities that may become involved in a land SAR incident should ensure that their members are familiar with police arrangements for alerting and dispatching of rescue units.
- 8.25. First Aid Training:** All personnel involved in SAR need to be trained in basic first aid. Each State/Territory has first aid training capabilities, via their State/Territory Ambulance Services, St John's Ambulance or private providers. While all personnel should have a basic first aid knowledge, at least one member of each search team should be qualified to a higher level of training, Senior First Aid or First Response First Aid. Regular training needs to be carried out to instil confidence in the delivery of first aid in remote situations.
- 8.26. Droptmaster and Dispatchers:** The dispatch of survival stores and equipment from an aircraft to survivors on land or over water is an exacting task, which, if not performed well, can nullify or seriously delay the rescue effort and may endanger the aircraft.
- 8.27.** Supply dropping operations by civil aircraft should only be carried out by personnel trained in the preparation and delivery of droppable equipment in accordance with CASA regulations.
- 8.28.** Joint exercises involving all authorities who organise or participate in land rescue should be arranged on a periodic basis.
- 8.29. Air Observer Training:** Major SAR operations require a considerable number of observers who may be drawn from various organisations. RCC has published a comprehensive handbook for Observers that is available to all SAR Authorities from the SAR Resources and Training section of AMSA. Observer leaders, observer briefing check lists, aircraft observer instructions and observers on ships are discussed in detail at Chapter 5.
- 8.30. Team Skills:** Whilst the ability to 'see' in the bush is probably the most important skill for a member of a search team, there are a number of other skills in which the searcher must be trained if they are to operate successfully. In addition, individuals must train together to increase their effectiveness as a team. The Team Leader is responsible for continuous training of the team to ensure that they will be capable of searching effectively. Much of this training only comes with regular practise and cannot be gained in one annual search exercise.
- 8.31. Individual Skills:** Each search team member must receive training in:
- a. map reading and navigation;
 - b. radio operating procedures;
 - c. basic first aid;
 - d. fieldcraft;
 - e. observation; and
 - f. search techniques.
- 8.32. Map Reading & Navigation:** Training is to be in accordance with the established map reading plans for each State/Territory.
- 8.33. Radio Operating Procedures:** Training is to be in accordance with established standards within each State/Territory and the Australian Emergency Manual—Communications.
- 8.34. First Aid:** Adequate training in first aid is available through organisations such as the St. John Ambulance, Red Cross, or other recognised providers.

- 8.35. Fieldcraft:** Fieldcraft is a broad subject which is difficult to define in its entirety. It is a series of practical skills which can only be taught in the field. The aspects of fieldcraft which are important to the searcher are:
- searching ground by eye;
 - judging distance;
 - basic tracking; and
 - living in the bush.
- 8.36. Observation:** Observation is the skill of looking for clues and may be required to be conducted by day or night. The principles of clue recognition and interpretation are shown as Annex Q to this Manual.
- 8.37. Observation Skills-Day:** The ability to 'see' rather than just look, may need to be taught when operating in the unfamiliar bush environment, and observing changes and noting details are skills which must be developed in most people. To understand why things are seen, it must be explained that several factors are involved which aid this process:
- Shape**—regular shapes do not occur in nature.
 - Shine**—rarely do natural things shine.
 - Shadow**—unusual shadows will often reveal what may appear to be hidden.
 - Movement**—immediately attracts the eye.
 - Colour**—differences to the natural background are obvious to the trained eye.
 - Spacing**—regular spacing does not occur in nature.
- These factors are best demonstrated in a bush environment, and with a better understanding of them, the searcher will become a better observer.
- 8.38. Observation Skills – Night:** Due to the physical characteristics of the eye, if an observer looks directly at a small or dim object at night, it may not be seen. To optimise night vision objects should be observed 'off centre':
- Off Centre (Averted Vision):** To achieve 'off centre' vision, the eye should be 'aimed off' from the object about a fist's width at arms length. Only by experiment can the searcher find out which direction is most suitable for their aim off ie above, below or to one side of the object. It is important that the searcher resist the temptation to look directly at the object.
 - Scanning:** Scanning is the short, abrupt movement of the eye over or around an area of observation or an object that is being kept in view. It is used in conjunction with off centre vision in order to gain the maximum use of the eyes at night. Therefore, the observer should move their visual axis every 4–10 seconds. Night scanning differs from day-time scanning. Should the day-time technique of looking from left to right in overlapping parallel bands from near to far be used, then nothing would be seen.
 - Staring:** It is important to realise that when staring at a stationary light or prominent object in an otherwise black scene, the object may start moving. This happens because the eye has no bearing on which to check the exact position. This can be prevented by 'placing' the object against something else such as a finger at arms length.
 - Confidence:** In order to gain confidence in the ability to see under low light levels, the correct use must be made of the eyes. Objects seen at night tend to be fuzzy and hazy around their extremities. Through practice, an observer must learn to recognise objects at night and how they differ from their day-time appearance. Once a searcher is familiar with the techniques of seeing at night, the confidence necessary for night operations will quickly follow.
 - Protection of Night Vision:** Any bright light will spoil night vision. It is important that the searcher instinctively closes, or covers one eye when faced with any light at night. In addition they should:
 - avoid looking at any bright light unnecessarily;

- (2) shield the eyes with their hand from flares, spotlights or headlights (by so doing it is possible to see objects moving beyond the lights and it also protects the night vision);
 - (3) avoid waving torches about as not everybody will be quick enough to close their eyes in order to avoid being dazzled;
 - (4) put one hand over the glass when using torches to map read, and use the fingers to limit both the area illuminated and the brightness of the light (keep one eye shut and the time spent on reading the map to a minimum); and
 - (5) use of coloured filters on torches will assist in maintaining night vision although similar coloured markings on maps cannot be seen.
- 8.39. Search Techniques:** Training in search techniques is to be in accordance with Chapter 5 of this Manual.
- 8.40. Team Skills:** To ensure success, it is necessary to train as a team, even if all the individual training has been undertaken.
- 8.41. Searchers:** All persons involved in searches need specific skills, attributes, equipment and both physical and mental capabilities:
- a. **Attitude**—Must be psychologically prepared for both the rigours of the search operation and for the possibility of locating a seriously injured or deceased person.
 - b. **Personal Equipment**—Each searcher must be self-sufficient in personal equipment. Such equipment should be capable of being carried on the person, in pockets or on a belt. The carriage of excess equipment should be avoided as searchers must remain highly mobile.
Suggested items include:
 - (1) clothing and footwear appropriate to the weather and the environment;
 - (2) appropriate headgear;
 - (3) filled water bottles;
 - (4) pocket knife and whistle;
 - (5) notebook and pen;
 - (6) compass and map (if required);
 - (7) snacks and nibbles;
 - (8) sun cream, insect repellent etc; and
 - (9) minor personal first aid items.
 - c. **Readiness**—A readiness for the search including:
 - (1) commitment to the task;
 - (2) time commitment for the entire search rather than small segments of it;
 - (3) discipline and teamwork; and
 - (4) acceptance of hardships.
 - d. **Fitness**—Searchers must be sufficiently fit to cope with the physical demands for the search activity.
- 8.42. Search Team Leaders:** The Search Team Leader is the vital link between the SMC and the search team. The leader must be highly trained and motivated with the experience and background knowledge which is necessary to successfully lead the team in the field. This can only be gained by constant training under realistic conditions.
- 8.43. Desirable Qualities:** Land searches involve people, therefore it is essential that the Team Leader has the knowledge, experience and personality to effectively lead and control the team. The leader must be an effective manager, must be aware of the capabilities of the team, have an understanding of each member's limitations and have their general well being in mind. There is a need for adequate rest, food and shelter during operations and the Team Leader must ensure that this is provided.

8.44. The attributes of a Team Leader include:

- a. leadership skills;
- b. dedication;
- c. knowledge; and
- d. flexibility.

8.45. Skills: The main skills for a Team Leader are as follows:

- a. **Orders**—The ability to give clear, concise and detailed orders.
- b. **Map Reading and Navigation**—The ability to read a map and navigate in a variety of terrain.
- c. **Use of Radios**—Use a radio, pass messages and use the terrain to best effect.
- d. **Casualty Handling**—The Team Leader must have a sound knowledge of first aid and casualty handling procedures.
- e. **Fieldcraft**—Must be skilled in living, navigating and operating in the field.
- f. **Search Techniques**—Must be competent in the implementation of all appropriate search techniques.

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Chapter Nine - Medical Factors

- 9.1. Time Frame For Survival (TFFS):** The time-frame for survival is an assessment of the minimum and maximum period a missing person is likely to live. This assessment is subjective and contains numerous variables including the physical condition of the person, their age, general health, clothing, weather conditions, the ability to remain dry, and their consumption of food, water and alcohol. There are a number of medical conditions that go hand in hand with search and rescue missions. These can be loosely divided into cold weather problems and hot weather problems. We will touch briefly on both of these topics to give you, as a co-ordinator, a basic understanding and awareness.
- 9.2. Survivor Stress Factors:** Two basic assumptions are to be made concerning survivors of a distress incident:
- there are always survivors who require emergency medical care; and
 - they are under a condition of great stress and experiencing shock.
- 9.3.** It may also be assumed that not even able-bodied, logical-thinking survivors will be able to help themselves.
- 9.4.** Records include numerous accounts where supposedly able-bodied, logical-thinking survivors failed to accomplish extremely simple tasks in a logical order, and thus hindered, delayed or even prevented their own rescue.
- 9.5.** This is due to shock that, following an accident, is often so great that even those of strong mind think and act illogically. All survivors will be in some degree of shock. Some may be calm and somewhat rational, some may be hysterical and in panic, while the remainder will be temporarily stunned and bewildered.
- 9.6.** This last group will generally have passive attitude and can be easily led during the first 24 hours after the incident. As the shock wears off, most of them will develop active attitudes. Those that do not develop active attitudes will die unless rescued quickly.
- 9.7.** Individuals who observe an emergency situation and reporting it to the SAR system should also be considered as being under stress. Many times it will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency. This situation should be expected and SAR personnel should be prepared to cope with it.
- 9.8. Survival Environment Factors:** The environment in which the survivor is exposed is another factor that limits the time available to complete their rescue. In some cases, environment will be the most time critical of all. Climatic atlases are useful to evaluate probable climatic conditions in regions where few or no weather reporting facilities are available.
- 9.9.** The relation of survival time to water temperature, air temperature, humidity and wind velocity is not a simple one. These and other factors often exist in combination to complicate the problem of estimating life expectancy of survivors. Individuals will vary in their reaction to cold and heat stresses.
- 9.10.** Additional factors which will vary a survivor's life expectancy include the type of clothing worn, the clothing's wetness, the survivor's activity during their exposure, initial body temperature, physical conditions, thirst, exhaustion, hunger, and various psychological stresses such as isolation, loneliness and remoteness, and the all-important individual will to live.
- 9.11.** The graphs contained in this chapter are provided to assist the SMC in determining the urgency required to remove survivors from the environment, and to assist in evaluating the practicality of terminating a search. These graphs are based upon case histories, field

tests, laboratory experiments and analysis of all known data. However, the SMC must understand that some individuals will exceed the life expectancy or tolerance times indicated in these figures, and therefore should consider these figures as helpful guidelines rather than absolute controlling factors.

- 9.12. Hypothermia:** Hypothermia is the abnormal lowering of internal body temperature (heat loss) and results from exposure to the chilling effects of cold air, wind or water. Death from hypothermia may occur in both land survival and water survival situations. Hypothermia is the leading cause of death for dementia suffers located deceased after being reported missing.
- 9.13.** Internal body temperature is the critical factor in hypothermia. If the body temperature is depressed to only 35°C, most persons will survive. If the body temperature is depressed to approximately 33°C, most persons will return to useful activity. At about 32°C, the level of consciousness becomes clouded and unconsciousness occurs at 30°C. Only 30 percent would be expected to survive these temperatures. At body temperature depressions of 26°C and below, the average individual will die, and ventricular fibrillation (heart attack) will usually occur as the final event. However in some cases individuals have survived with body temperatures as low as 17°C.
- 9.14. Water Hypothermia:** The body will cool when immersed in water having a temperature of less than 33°C. The warmest temperature that ocean water can be at any time of year is 29°C. Approximately one-third of the earth's oceans have water temperatures of 19°C or above. Most dams and inland waterways have water at temperatures far less than that of the ocean.
- 9.15.** The rate of body heat loss increases as the temperature of air and water decreases. If a survivor is immersed in water, hypothermia will occur very rapidly due to the decreased insulating quality of wet clothing and the fact that water will displace the layer of still air that normally surrounds the body. Water allows a rate of heat exchange approximately twenty five times greater than that of air at the same temperature.
- 9.16.** In water temperatures above 21°C survival time depends solely upon the fatigue factor of the individual, some individuals having survived in excess of 80 hours at these temperatures.
- 9.17.** Between 15°C and 21°C an individual can survive up to 12 hours. At 15°C skin temperatures will decrease to near water temperature within 10 minutes of entry and shivering and discomfort is experienced immediately upon immersion. Dunking and submersion difficulties become increasingly distressful to the survivor.
- 9.18.** From 10°C to 15°C the survivor has a reasonably good chance if rescue is completed within 6 hours. Faintness and disorientation occur at water temperatures of 10°C and below. Violent shivering and muscle cramps will be present almost from the time of entering the water and intense pain will be experienced in the hands and feet. This very painful experience will continue until numbness sets in.
- 9.19.** All skin temperatures decrease to that of the surrounding water temperature in about 10 minutes. In the temperature range from 4°C to 10°C, only about 50 per cent of a group can be expected to survive longer than 1 hour. In water temperatures of 2°C and below the survivor suffers a severe shock and intense pain on entering the water. This shock in some instances may be fatal owing to loss of consciousness and subsequent drowning.
- 9.20.** Water survivors who die within 10 to 15 minutes after entry into frigid water apparently do not succumb because of reduced body temperature, but rather from the shock of rapid entry into cold water. Fifteen minutes is too short a time for the internal body temperature to fall to a fatal level, even though the outer skin temperatures are at the same temperature as the water. In addition, the temperatures of the hands and feet fall so rapidly that such immersions are frequently less painful than those in 4°C to 10°C water.
- 9.21.** Factors that slow the loss of body heat are:

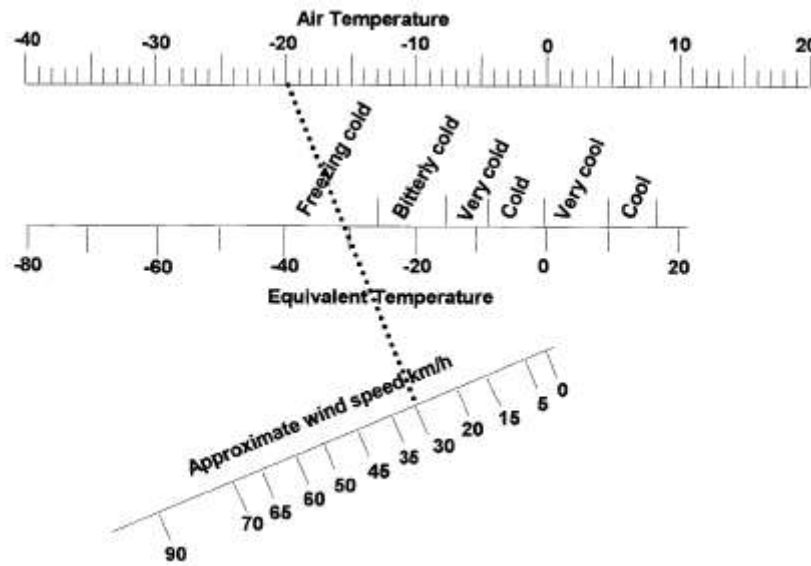
- a. high body weight,
- b. heavy clothing,
- c. survival clothing,
- d. or the use of a huddling or other protective behaviour.

Factors that make a person lose body heat faster are:

- a. low body weight,
- b. light clothing,
- c. or exercising (such as the situation where a survivors without lifejackets must swim to stay afloat).

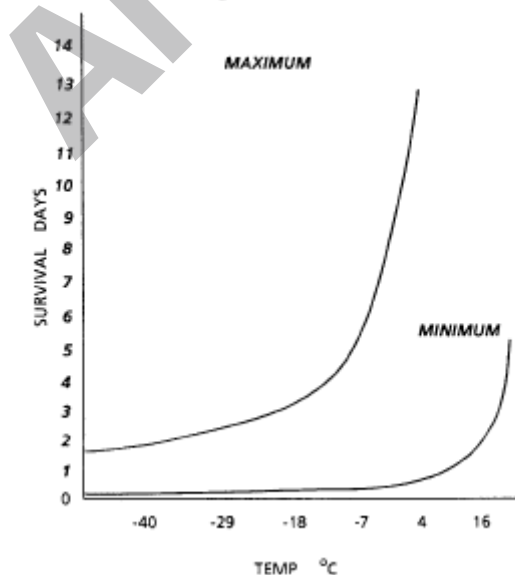
Specialised insulated protective clothing, such as immersion suits or wet suits, is capable of increasing survival time from 2 to 10 times the basic duration shown on the figure.

- 9.22. Wind Hypothermia:** Although the body will lose heat approximately twenty-five times slower in calm air than when immersed in water, the body heat loss will be accelerated with increasing wind velocities. This is an additional factor to consider for exposed survivors.
- 9.23.** Hypothermia can occur on land as well as at sea. A human has a much greater chance of suffering hypothermia if immersed in the sea or other waterway. The warmest sea water will get to is about 29°C, with a world wide average of 19°C. Temperature loss in water is about 25 times greater than in air of the same temperature. Therefore immersion in the sea can drop body core temperatures very quickly.
- 9.24.** Hypothermia can happen during cold nights in desert country or anytime in the colder areas of the State. It occurs when the body's temperature falls below 35°C. It is characterised by intense shivering, followed by loss of co-ordination, confusion and irrationality. If it is not halted unconsciousness will follow and then death. This can happen in a period as short as one hour. Once the body's core temperature falls to 28°C the heart will stop. If a person is wet, ill or dehydrated it will lessen their chances of fighting off hypothermia. Symptoms are shivering, poor co-ordination, decreasing levels of consciousness, slow and irregular pulse and numbness. This is a medical emergency. To treat, remove from the cold, remove any wet clothing, move to a warm area if possible. Cover the victim with blankets and apply hot water bottles or pads. Remember that the victim has lost body heat and will not be able to warm themselves so just covering them with a blanket will not do, you have to provide a source of warmth. Warm slowly. Seek urgent medical attention. Do not allow the victim to relax as the sudden rush of cold blood from the extremities can cause the heart to stop. This has happened during previous SAR missions when the victim has been located, relaxed and has gone into cardiac arrest.
- 9.25.** Assume that there are always survivors who require medical attention and that they are under great stress and shock until evidence suggests otherwise.
- 9.26.** Not even able bodied, logical-thinking persons can help themselves when suffering the effects of hypothermia and stress.
- 9.27.** Persons assessing a time frame for survival must recognise the limitations of such an assessment and not regard it as an arbitrary period for survival. The following subsections may assist in providing a guide to assist in search planning.
- 9.28. Wind Chill:** This is the sensation of cold felt by humans as a result of wind movement. This causes people to feel colder than the actual temperature, even in low wind conditions. The wind-chill diagram below is an adaptation of the work of Steadman and Dixon where the wind speed has been converted from metres per second to kilometres per hour, rounded up or down to the nearest 5 km.



Wind Chill Table

- 9.29. The dotted line is an example where the air temperature is -20°C and a wind speed of approximately 30 km/h. This produces an equivalent temperature of -32°C on exposed flesh.
- 9.30. **Hypothermia:** Hypothermia is the condition experienced when the human body's core temperature **decreases** from a 'normal' 37°C to less than 35°C . Hypothermia in a field environment can result from cold water immersion, exposure to cold wet conditions, or from a variety of medical conditions. As this is a life-threatening condition, the possibility of hypothermia will influence the time-frame for survival. As environmental conditions of rain, wind and snow worsen, the opportunity for body heat loss increases. This loss can be countered by insulation with clothing, both windproof and/or rainproof. As a rough guide, a person suffering from hypothermia when the temperature is 0°C may be expected to survive from as little as four hours up to ten or more days.

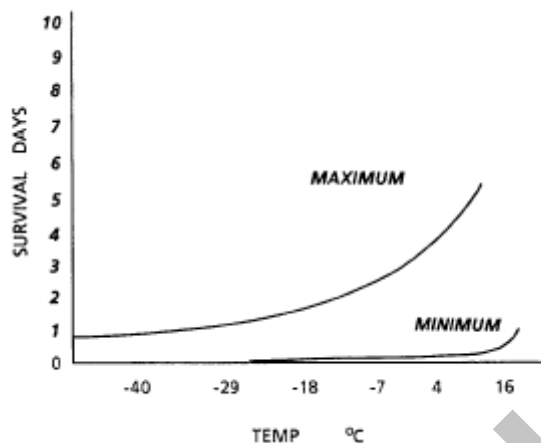


Hypothermia Survivability Graph

- 9.31. **Hypothermia Survivability:** The above graph which describes the range of days for fatal exposure or hypothermia survivability, in days, for a given temperature. The information

calculated is a guide only and is based upon a healthy 25 year old male wearing the equivalent of normal clothing, including a jacket.

- 9.32. Wet-Chill Survivability:** The below graph which describes wet-chill survivability. Accidental hypothermia resulting from wet-chill is the most dangerous and commonly-fatal weather hazard. Essentially, wet-chill is the wetting of the missing person in cold and windy weather. The result is a significant decrease in that person’s ability to survive.



Wet Chill Survivability Graph

- 9.33. Water Immersion:** Hypothermia induced by immersion in cold water has a more rapid onset. There is no ready answer to how long a person will survive as there are many factors involved including:

- (1) water temperature;
- (2) duration of immersion;
- (3) insulation (body fat and clothing worn);
- (4) level of activity; and
- (5) weather conditions (especially wind and wave action).

The following chart is a guide to the survival time of a lean person in rough water and should not be regarded as arbitrary. For this reason, searchers must treat cold water areas such as streams, lakes and dams as significant danger to the missing person(s).

Clothing Type	Time to Incapacity (Body Core Temp 34°C)	Time to Unconsciousness (Body Core Temp 30°C)	Time to Cardiac Arrest (Body Core Temp 25°C)
Light Clothing	0.4 Hrs	0.8 Hrs	1.3 Hrs
4.8 mm Wet Suit	1.6 Hrs	3.2 Hrs	4.9 Hrs
Insulated Dry Clothing	3.0 Hrs	5.7 Hrs	9.1 Hrs

Water Immersion Table Based on Steinman and Kublis (1986)

NB: The above times are not cumulative and are a guide only. An example of the variation in survival time between two persons in light clothing immersed in water at 6°C is that one could remain capacitated for 1.3 hours whilst the second could go into cardiac arrest in the same time.

- 9.34. Effects of Alcohol:** The consumption of alcohol can impact upon the time-frame for survival, both in hot and cold environments. Alcohol is likely to accelerate dehydration in hot climate and may lessen the ability to retain heat in cold areas.
- 9.35. Hyperthermia, Heat Stress and Dehydration:** Hyperthermia, heat stress and dehydration are dangers in hot climates, particularly in desert areas. The most severe form of heat

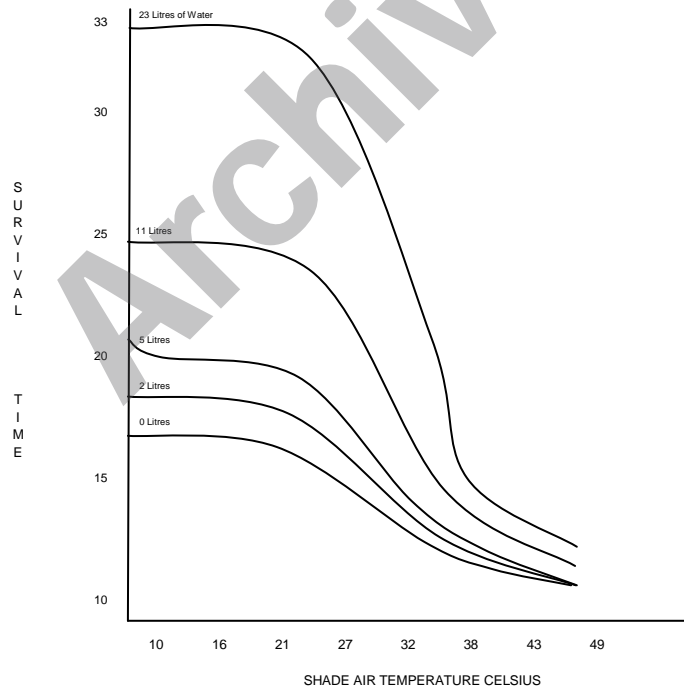
- stress is heatstroke, during which the body temperature rises due to the collapse of the temperature control mechanism of the body. If the body temperature rises above 42°C, the average person will die. Milder forms of heat stress are heat cramps and heat exhaustion. Another limiting factor both in hot climates and in survival situations at sea is dehydration. A person totally without water can die within a few hours (Western Qld 1999 4 hrs from leaving vehicle to death), although some have survived for a week or more.
- 9.36.** The human body functions best at 38°C ± 2°C, although it will tolerate the core temperature dropping to 33°C or rising to 42°C with a good chance of full recovery. Between 32°C and 26°C body functions begin to shut down and unconsciousness usually follows. Below 26°C the average individual will perish, although there have been many cases of persons surviving. Temperatures above 43°C will prove fatal in most circumstances unless urgent medical assistance is sought. Death can occur in as short a period as four hours.
- 9.37.** The least serious, but still potentially dangerous, of the heat related problems are muscular cramps. The exact cause is unknown but the onset of cramps can be rapid. They mostly affect the larger muscles of the body, but can occur in any of the body's muscles. Cramping is brought on by strenuous activity in warm or moderate temperature conditions and can be described as a bunching or shortening of the muscles causing what feels like a knot. To alleviate cramps place the victim in a cool, comfortable place, provide cool water but do not give salt or salt tablets as a normal diet contains adequate salt for recovery. The cramped muscles may be lightly stretched and massaged to hasten recovery. Recovery is normally swift.
- 9.38.** **Heat exhaustion:** Is the next most serious of the heat related illnesses. It is brought on by long periods of activity in a hot environment. This not only occurs with persons in arid areas but also to fire-fighters and factory workers working in confined spaces with high temperatures. To maintain a constant body temperature in hot weather the body sweats, using the evaporation of body fluids from the skin to produce a cooling effect. A side effect of this is the loss of vital body fluids which in turn decreases blood volume. Blood temperature then rises resulting in an increased blood flow to the limbs to assist in cooling, reducing blood flow to the internal organs. This lack of blood can cause shock and heat exhaustion. If recognised early heat exhaustion can often be controlled and reversed. If left undetected the body's temperature will continue to rise and will result in changes in levels of consciousness. Symptoms include dizziness and weakness, exhaustion, rapid and weak pulse, nausea, headache, skin that may feel cool and moist and look pale but progressing to hot and red. First aid treatment of heat exhaustion is vital. If conscious lay the victim down in a cool and shaded area with legs slightly elevated, remove or loosen tight clothing, give water in small quantities. If vomiting or unable to drink seek urgent medical attention. If the victim is unconscious place them in the recovery position in a cool and shaded area. Check breathing, airway and circulation. Keep them cool and seek urgent medical attention.
- 9.39.** **Heat stroke:** Is the most serious of the heat related illnesses. As the body's fluid levels become low sweating stops. As a result of this the body's core temperature continues to rise. The lack of blood to the vital organs necessitates that blood be brought from the limbs back to the core, thereby contributing to a further increase in body temperature. At this stage the body is unable to cool itself and the temperature rises rapidly. Vital organs then begin to fail; convulsions, unconsciousness and death soon result. Symptoms of heat stroke include rapid, shallow breathing, a pulse that may be strong and rapid at first but deteriorating to weak and irregular, falling in and out of consciousness, hot, dry and red skin and a high body temperature. Treatment is similar to heat exhaustion. Stop the victim from doing anything; at this stage they will have lost the ability to make rational decisions. Place them in a cool area, lying down with the legs elevated. Cool the body and

given small quantities of cool water. Seek urgent medical assistance. To cool the body remove any tight or restrictive clothing and any clothing soaked with perspiration. Cover the skin with cool and wet items such as towels. Fan the body to aid in evaporation and cooling. Continue to do so until the body's temperature falls to 38°C.

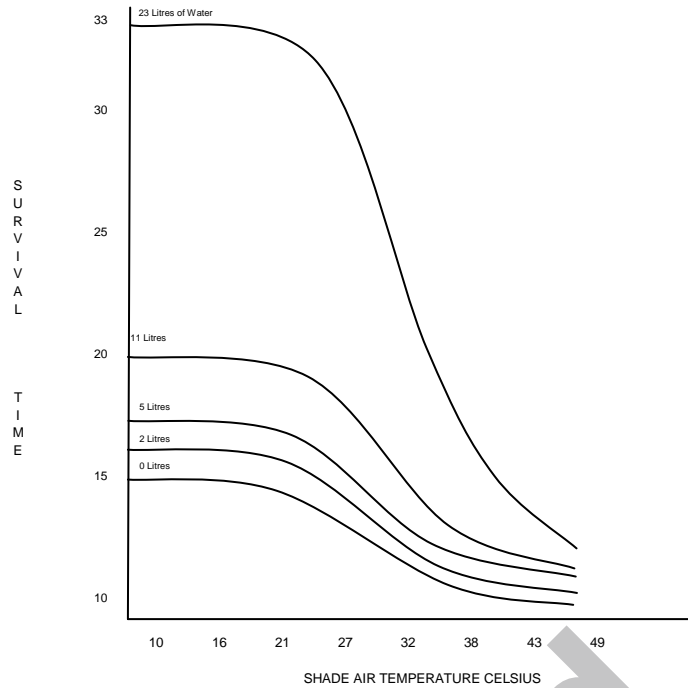
9.40. In all cases rapid assessment of the situation and prompt first aid can mean the difference between life and death. If you have any doubt about which stage a victim may be in then assume the worst and treat accordingly.

9.41. Dehydration is the excessive loss of water from the body, this leads to an imbalance in the electrolytes. As the body is composed mostly of water there needs to be equilibrium between water lost, as in sweat and urine, and water gained as in drinking and food. If more water is lost than ingested then dehydration is the result. Severe dehydration can end in death. Small amounts of water or clear fluids can assist a person suffering dehydration but ultimately medical attention needs to be sought as fluids can be replaced more efficiently intravenously. The body can only take in approximately 1.1 litres of liquid per hour via the stomach whereas intravenous fluids can be introduced at a much greater rate if necessary.

9.42. Hyperthermia: Hyperthermia is the condition experienced when the human body's core temperature **increases** from a 'normal' of 37°C to more than 39°C. If the missing person's core temperature exceeds 42°C, the person might be expected to die. The below graphs provide a guide to expected desert survivability but should not be regarded as arbitrary. The old survival adage of 3 minutes without air, 3 days without water and 3 weeks without food should be remembered when referring to these graphs.

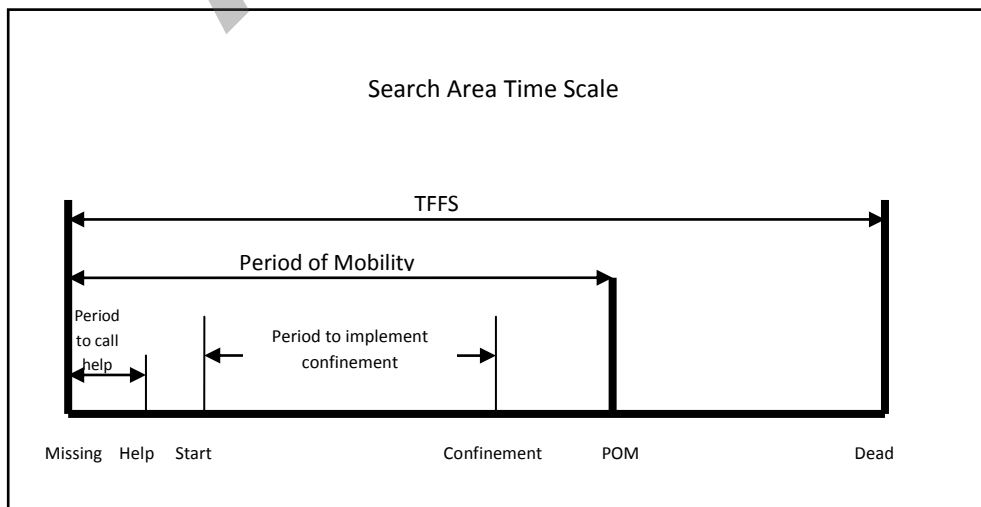


Approximate Desert Survival (Survivor Stationary)



Desert Survival (Survivor night walking)

- 9.43. **Dehydration:** The rate of dehydration will vary with the temperature, movement of the missing person, their medical condition and other factors. As a guide, a person missing and who has access to only 2 litres of water may be expected to survive from as little as a few hours in extremely hot climates, to as much as 20 or more days in temperate climate. It should be remembered that alcohol is not a substitute for water and may accelerate dehydration.
- 9.44. **Period of Mobility (POM):** The period of mobility or time to confinement since missing are used to assess the maximum distance a missing person could travel which will, in turn, dictate the size of the overall search area. An assessment of the period of mobility can be made by assuming a mobility period of 2/3 or 67% the missing person’s time frame for survival.



- 9.45. Search Area Time Scale:** The total search area time-scale may be plotted to give a clear picture of the situation and the time by which the missing person should be found, to ensure the greatest chance of survival.
- 9.46. Example:** A person is missing in the alpine area of NSW. The wind is 40kph from the south. Air temperature is 0°C degrees and they are wearing nothing but underclothes. Using the wind chill table we can ascertain that the equivalent air temperature is going to be very cold, about -12°C. Consultation with the hypothermia graph will give an approximate period of survival of between ¼ day (6hrs) and 4 ½ days. If our missing person can find shelter and warmth he may survive to the 4 ½ day period. If he remains out in the open with limited clothing he will perish in the 6 hours. It now starts to rain, soaking our MP. Consulting the Wet Chill Survival graph we can see that there will be a distinct shortening of the TFFS. It is now between about 4 hours and 2 days, depending on what the MP is able to find by way of shelter and warmth. The POM can be as short as 2 ½ hours to just over a day. There is a definite amount of urgency required now. The desert survival charts can be read in a similar way, but be aware these are for the northern hemisphere. There are a number of recorded instances where persons have perished in the desert in as little as four hours without water.

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Appendix A

Australian States and Land Search Areas.



The Police Services in each State and Territory are responsible for Land Search and Rescue within the boundaries of their respective State or Territory, including any islands. The ACT is also responsible for a small area of land at Jervis Bay, NSW.

Statistics:

State/Territory	Population	Size (km ²)
Australian Capital Territory:	377 000	2 452
New South Wales	6 782 000	811 428
Northern Territory	249 000	1 346 200
Queensland	4 100 000	1 787 200
South Australia	1 532 000	1 024 377
Tasmania	482 000	67 800
Victoria	4 984 000	227 600
Western Australia	1 987 000	2 525 500
Total	21 000 000	7 617 930

Appendix B: National Search and Rescue (SAR) Responsibilities and Functions

Table of Responsibilities

DIVISION OF RESPONSIBILITY	FUNCTION TO BE PERFORMED BY, OR ON BEHALF OF, THE OVERALL COORDINATING AUTHORITY						
	Responsible Authority ¹	Provision and coordination of air SAR units.	Provision and coordination of land SAR units.	Provision and coordination of marine SAR units.	Communication (other than air/surface)	Air/ground communication for land search and rescue.	Aircraft/ship communication where direct communications not available.
For land, sea and air SAR, in respect of:							
International civil aircraft, manned space vehicles and aircraft on the Civil Aviation Safety Authority (CASA) and Recreational Aviation Australia (RA-Aus) Registers	JRCC Australia	JRCC Australia	Police	JRCC Australia Police	JRCC Australia Police	Airservices Australia Police	Airservices Australia
Persons on or from a Vessel at Sea ²	JRCC Australia Police ³	JRCC Australia Police	Police	JRCC Australia Police	JRCC Australia Police	Airservices Australia Police	Airservices Australia Police
Persons and vehicles on land; and Persons and vessels on inland waterways and in waters within the limits of the ports of the relevant State or Territory	Police	Police JRCC Australia ⁴	Police	Police	Police	Police Airservices Australia	Police Airservices Australia

DIVISION OF RESPONSIBILITY	FUNCTION TO BE PERFORMED BY, OR ON BEHALF OF, THE OVERALL COORDINATING AUTHORITY						
	Responsible Authority ¹	Provision and coordination of air SAR units.	Provision and coordination of land SAR units.	Provision and coordination of marine SAR units.	Communication (other than air/surface)	Air/ground communication for land search and rescue.	Aircraft/ship communication where direct communications not available.
For land, sea and air SAR, in respect of:							
Aircraft not included in the CASA and RA-Aus registers including ultralights, paragliders, hang-gliders, and gyrocopters.	Police	Police JRCC Australia ⁵	Police	Police JRCC Australia	Police Airservices Australia	Police Airservices Australia	Police Airservices Australia
Australian Defence Force (ADF) and Foreign Military Personnel, Aircraft, Ships and Submarines	ADF ⁶	ADF	ADF	ADF	ADF	ADF	ADF
Unidentified Distress Beacon Alerts	JRCC Australia	JRCC Australia	Police	JRCC Australia Police	JRCC Australia	JRCC Australia Airservices Australia	JRCC Australia Airservices Australia

Table Notes:

¹ The first SAR Authority to become aware of a SAR incident is obliged to respond until overall coordination can be transferred to the 'Best Placed' SAR Authority in accordance with the provisions of the Inter-Governmental Agreement on National Search and Rescue Arrangements 2012 and the principles set out in the National SAR Manual

² Other than those for which the ADF is responsible.

³ Responsibility for the rescue of persons from vessels at sea will be determined in accordance with the 'Best Placed' provisions of the Inter-Governmental Agreement on National Search and Rescue Arrangements 2012 and the principles set out in the National SAR Manual.

⁴ JRCC Australia involvement when requested to arrange for the provision of aircraft or accept coordination of air search in accordance with the principles set out in the National SAR Manual

⁵ JRCC Australia involvement when requested to arrange for the provision of aircraft or accept coordination of air search in accordance with the principles set out in the National SAR Manual

⁶ ADF involvement in search and rescue is arranged through HQUOC (Headquarters Joint Operations Command) in accordance with the principles set out in the National SAR Manual

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Appendix C

INTER-GOVERNMENTAL AGREEMENT ON NATIONAL SEARCH AND RESCUE RESPONSE ARRANGEMENTS

This AGREEMENT is made on the 29th day of June 2012.

BETWEEN

THE COMMONWEALTH OF AUSTRALIA

THE STATE OF NEW SOUTH WALES

THE STATE OF VICTORIA

THE STATE OF QUEENSLAND

THE STATE OF WESTERN AUSTRALIA

THE STATE OF SOUTH AUSTRALIA

THE STATE OF TASMANIA

THE NORTHERN TERRITORY OF AUSTRALIA

THE AUSTRALIAN CAPITAL TERRITORY

(‘The Parties’)

Definitions:

‘AMSA’ means the Australian Maritime Safety Authority

‘Australian search and rescue authority’ means the Australian Maritime Safety Authority.

‘Australian Emergency Manual for Land Search Operations’ is the Australian Emergency Manual for Land Search Operations endorsed by the National SAR Council as the standard reference used by search and rescue authorities for land search operations.

‘State and Territory search and rescue authorities’ means the following agencies nominated by each Party to this agreement:

The New South Wales Police by the State of New South Wales;

The Victorian Police by the State of Victoria;

The Queensland Police by the State of Queensland;

The Western Australian Police by the State of Western Australia;

The South Australian Police by the State of South Australia;

The Tasmania Police by the State of Tasmania;

The Northern Territory Police by the Northern Territory;

The Australian Federal Police by the Australian Capital Territory; and

The Australian Federal Police for the territories of Jervis Bay, Christmas Island, Cocos (Keeling) Islands, and Norfolk Island.

‘National SAR Council’ means the National Search and Rescue Council as constituted in accordance with paragraph 4 of this agreement.

‘National Search and Rescue Manual’ means the National Search and Rescue Manual endorsed by the National SAR Council.

‘Vessels’ and ‘craft’ do not include vessels and craft of the Australian Defence Force.

Principal Agreements:

A. The Parties are agreed that:

(i) The National Search and Rescue arrangements for coordination of resources to be used in search and rescue operations are fundamental to the success of a national search and rescue service; and

(ii) The promotion of continued cooperation in the provision of search and rescue between the Australian SAR authority and each of the State and Territory authorities is essential.

B. The Parties are agreed that the critical elements of the National Search and Rescue Response Arrangements are:

(i) The National SAR Council is the main coordinating body for search and rescue response arrangements in Australia;

(ii) The National SAR Council is to sponsor and promote development and use of the National SAR Manuals;

(iii). The Australian and State/Territory SAR Authorities are to follow the cooperative arrangements described in the National SAR Manuals

(iv). Continued recognition and maintenance of the long standing and well understood division of responsibility between the Commonwealth and the State/Territories for search and rescue in relation to persons, vessels, vehicles and aircraft; and

(v). That Parties will plan and resource for search and rescue responsibilities as set out in the National SAR Manual, recognising and accepting that the first SAR Authority to become aware of the search and rescue incident is obliged to respond until the overall coordination can be transferred to the SAR Authority best placed to coordinate the response, in accordance with the principles set out in the National SAR Manuals.

C. The Parties accept the administrative and funding arrangements underpinning the operation of the National Search and Rescue response Arrangements as outlined in this agreement.

D. The Parties agree to support the national Search and Rescue Arrangements to ensure that:

(i). Australia's obligations under international conventions and agreements relating to search and rescue are fulfilled;

(ii). The national approach to search and rescue coordination is continued and strengthened;

(iii). The National SAR Manual is formally recognised as the standard reference for use by the Australian and the State/Territory SAR Authorities.

(iv). Parties are clear about their responsibilities for planning for and resourcing search and rescue operations involving persons, vehicles, vessels and aircraft on land and at sea, in accordance with the National SAR Manual

(v). Mechanisms are in place to facilitate cooperative decision making; and

(vi). The obligations of Parties under this arrangement are met.

E. The Parties agree that this agreement updates and replaces the Agreement signed 30 June 2004.

F. The Parties note that AMSA, established under the *Australian Maritime Safety Authority Act 1990* as a Commonwealth statutory authority, has legislative function for the provision of a national search and rescue service in a manner consistent with Australia's obligations under the: *Convention on International Civil Aviation, 1944* ('Chicago' Convention);

International Convention for the Safety of Life at Sea (SOLAS) (the Safety Convention); and

International Convention on Maritime Search and Rescue, 1979 (the SAR Convention)

Accordingly, AMSA will act as Secretariat for the national SAR Council and will facilitate the implementation of this agreement.

HAVING REACHED THESE ARRANGEMENTS, THE PARTIES INTEND THE FOLLOWING:

OPERATION OF THE AGREEMENT

1. The Agreement will commence on the date it is signed by all Parties

2. The Parties will take such action as is provided for by this Agreement and as is otherwise required to achieve the objectives of the National SAR Response Arrangements in accordance with the roles and responsibilities set out below.

SCOPE

3. This agreement is intended to provide guidance to the SAR Authorities of all Parties

OPERATION AND FUNCTION OF THE NATIONAL SAR COUNCIL

4. The Parties agree that the National SAR Council will be the national coordinating body for search and rescue response arrangements.
5. The functions of the National SAR Council are to:
 - (i) oversee the implementation of search and rescue arrangements within Australia's search and rescue region for consistency with the National Search and Rescue Response Arrangements.
 - (ii) sponsor the National SAR Manual detailing agreed search and rescue response and coordination arrangements in Australia.
 - (iii) promote the ongoing effectiveness of the cooperative arrangements between the search and rescue authorities.
6. Membership of the Council comprises one representative from each of:
 - (i). the Australian SAR Authority
 - (ii). Each of the State/Territory SAR Authorities, and
 - (iii). The Australian Defence Force
7. The National SAR Council is chaired by AMSA and the secretariat for the National SAR Council is also provided by AMSA.
8. Each member bears its own costs and expenses incurred in the course of Council business.
9. The Council should meet at least annually and may conduct its business out of session, providing a record is agreed between members affirming the decisions made out of session. Meetings may be held face to face or by teleconference or videoconference. Notice of meetings and agendas will be given at least one week in advance, unless otherwise agreed by the members. Meetings will not be held unless a majority of members are able to attend.
10. Each Party will encourage the representatives from its SAR Authority to consider a whole-of-government perspective and not just the views of its own agencies.

AUSTRALIAN SEARCH AND RESCUE AUTHORITY

11. The Australian SAR Authority will have responsibility for coordinating search and rescue operations for:
 - (i) international civil aircraft, manned space vehicles, and aircraft on the Civil Aviation Safety Authority (CASA) and Recreational Aviation Australia (RA-AUS) registers; and
 - (ii) persons on or from a vessel at sea.
12. The Australian SAR authority will be responsible for any liaison with international search and rescue authorities that may be required in response to a search and rescue operation.

13. The Australian SAR Authority will be responsible for the overall coordination of any national emergency plan or arrangement involving search and rescue within the Australian search and rescue region

STATE AND TERRITORY SEARCH AND RESCUE AUTHORITIES

14. The States and Territories SAR authorities will have responsibility for coordinating search and rescue operations for:
 - (i) persons and vehicles on land;
 - (ii) persons and vessels on inland waterways and in waters within the limits of the ports of the relevant State or Territory and for fishing vessels and pleasure craft within a port or at sea;
 - (iii). Persons on or from a vessel at sea
 - (iv) aircraft not included in the CASA and RA-AUS registers including ultralights, para-gliders, hang-gliders, and gyrocopters; and
 - (v) land searches for missing registered civil aircraft in support of the national search and rescue authority.

15. The State and Territory SAR authorities will coordinate volunteer rescue organisations within their respective jurisdictions.

COOPERATIVE ARRANGEMENTS

16. The SAR authority first becoming aware of a search and rescue incident will take all necessary action until responsibility can be handed over to the search and rescue authority better placed to take overall coordination.

17. When a number of SAR authorities contribute to a search and rescue operation, one SAR authority will have overall coordination responsibility and the others will act in support in accordance with the procedures established by the National SAR Manual.

18. If an aviation or maritime search and rescue operation for which a State or Territory SAR authority has overall coordination may, by mutual consent, - be transferred to the Australian SAR authority in accordance with the procedures established by the National SAR Manual. Similarly, if the Australian SAR Authority is over committed with other search and rescue operations it may, by mutual consent, transfer overall coordination to a State/territory SAR Authority. No SAR authority will unreasonably refuse the transfer of overall coordination.

19. The Parties agree to ensure that any emergency management plan or arrangements that impacts on search and rescue preparedness and/or response, is considered by members of the National SAR Council to ensure that the appropriate coordination and harmonisation is in place.

RESOURCES AND FUNDING

20. Each Party shall provide resources to its SAR Authority based on planning for search and rescue as outlined above.

21. The Australian and the State and Territory SAR authorities shall each provide, without charge unless otherwise agreed, such assistance or facilities as reasonably may be requested by the authority with primary responsibility for coordinating the search and rescue operation.

22. A SAR authority that hires or requisitions privately owned facilities for a search and rescue operation shall, unless otherwise agreed between the authorities, bear any costs of hiring or payment of compensation for such requisitioning.

23. The costs of a search and rescue response to an activated distress beacon will be borne by the search and rescue authority that tasks the search and rescue facility.

24. Where the resources required to respond to a search and rescue exceed those available to any SAR Authority, or where the circumstances require significant coordination across Party Agencies, a search and rescue may develop into an emergency management response. Where a search and rescue results in State, Territory or national emergency plans or arrangements being activated, they are to be activated in support of national search and rescue response arrangements established through this agreement.

AMENDMENT AND TERMINATION

20. The Parties to this Agreement may at any time review this Agreement and, if they unanimously decide to terminate it, do all that is practicable to terminate it.

21. The Parties to this Agreement may at any time decide unanimously to modify this Agreement and will take all practical steps to give effect to their decision by executing a replacement Agreement.

Appendix D

TRANSFER OF SAR COORDINATION

Transfer

I, _____ on behalf of the

(Representative of the SAR Authority) (Authority)

Hereby formally request the transfer of overall coordination in accordance with paragraph 1.28 of the National Land Search Manual for the Search and Rescue action:

(Details of incident and location)

To _____ with effect

(Receiving Authority) (Date/Time group UTC)

(Signature/Date/Time Group)

Acknowledgement

I, _____ on behalf of the

(Representative of the SAR Authority) (Authority)

Hereby formally acknowledge and accept/ acknowledge and reject (If rejected for the following reason(s)):

(Signature/Date/Time group)

Coordinating Authorities:

Overall Coordination: _____

Coordinator Land Search: _____

Coordinator Air Search: _____

Appendix E

Search Urgency Assessment

Name of Incident:		No:	
Date Completed:	Time completed:	Initials:	Incident date:

Number of subjects		
1 person	1	
2 people or 3 or more –separated	2	
3 people or more – together	3	
Age		
Very young	1	
Other	2-4	
Very Old	1	
Medical Condition		
Known illness or requires medication	1	
Suspected illness or injury	2	
Healthy	3	
Known fatality	4	
Potential vision impairment	1	
Intent		
Suicidal	1	
No known intent	3	
Absconder from facility	4	
Cognitive Capacity		
Dementia / Alzheimer's /Parkinson's	1	
Capacity of 16 year old or less	1	
Diagnosed mental illness, depression or anxiety	2	
No known capacity issues	3	
Experience profile		
Not experienced, not familiar with area	1	
Not experienced – familiar with area	2	
Experienced – not familiar with area	3	
Experienced – familiar with area	4	
Physical Condition		
Unfit	1	
Fit	2	
Very fit	3	
Clothing profile		
Inadequate/insufficient	1	
Adequate	2	
Very good	3	
Equipment Profile		
Inadequate for activity/environment	1	
Questionable	2	
Adequate	3	
Very Well equipped	4	
Weather profile		
Existing Hazardous weather	1	
Hazardous forecast (8 hours or less)	2	
Hazardous forecast (more than 8 hours)	3	
No hazardous weather forecast	4	
Terrain and Hazards profile		
Known hazards	1	
Difficult terrain	2	
Few hazards	3	
Easy terrain, no known hazards	4	

9-17 Emergency Response 18-27 Measured response 28-40 Evaluate & Investigate

Note: If **any individual category** above is rated as **ONE (1)**, regardless of its total – the search could require an emergency response

Remember: the lower the number the more urgent the response!!!

Appendix F

Missing Person Questionnaire									
Incident:				Date:			Time:		
Surname:					Given names:				
Address:						Telephone: Mobile:			
DOB:				Ethnicity:			Sex:		
NOK:						Telephone:			
Hgt:	Wgt:	Bld:	Eyes:	Cmp:	Beard:	Scars:	Hair:	Lgth:	
Hiker Exp:			Climber Exp:			Swim Exp:			
Snow Exp:			Military Exp:			Camping Exp:			
First Aid Trn:			Map/Compass Trn:			Knowledge of area:			
Smoke:	Drink:	Fears:	Lost before:	Action then:					
Shirt:	Jumper:	Trousers:	Jacket:	Raingear:	Hat:				
Shoes:	Sole pattern:	Scarf:	Glasses:	Watch:	Jewellery:				
Other Clothing:						Clothes for dog scent:			
Pack:	Colour:	Tent:	Colour:	Slp Bag:	Colour:				
Water Bottle:	Colour:	Torch:	Colour:	Slp mat:	Colour:				
Knife:	Matches:	Compass:	Firearm:	Fishing gear:	Camera:				
Ropes:	Climb Equ:	Kayak:	Radio AM:	Radio CB:	PLB:				
Map:		Name:			Scale:		Number:		
Vehicle Reg No:			Make/Model:			Colour:			
Medical History:			Physical Problems:			Psych Problems:			
Medication:			Amount carried:			Consequences:			
Doctor:			Address:			Telephone:			
Family Problems: (Financial, family)					Request for Aid (Welfare)				
Person to notify if found ALIVE:			Address:			Telephone:			
Person to notify if found DEAD:			Address:			Telephone:			
Remarks:									
Name:				Rank:		Station:			

Appendix G

Object Questionnaire			
SAR Number:		Date/Time:	
Description of Object: (If photo/drawing is available please attach)			
Make:	Model:	Reg/Serial No:	
Colour:	Dimensions:	Weight:	
Special Markings/Identifiers:			
Does this object pose any dangers to humans, animals or the environment? If so describe in detail:			
Who can be contacted to provide expert advice?			
Name:	Organisation:	Telephone Number:	Fax No:
What action is to be taken by searchers if object found?			
Information provided by:			
Name:	Organisation:	Telephone Number:	Fax No:
Remarks:			
Name:	Rank:	Section/Station:	

Appendix H

Land SAR Checklist			
Maintain chronological action log: (<i>Who spoken to? Times, Dates</i>)			
Missing person Questionnaire:		Completed:	
Search Area:			
Terrain		Hazards	
Communications		Assessment of scenarios	
Availability of resources		What's been done to date	
Isolate/Contain area		Local SAR Plan	
Weather (www.bom.com.au)			
At present		Forecast	
Sunset/sunrise		Potential hazardous weather	
Search Urgency			
Complete Search urgency Form		Determine appropriate response	
Update briefing to Insp/Sen Sgt/Duty Officer		Update RCC	
Advise Media Section		Advise Coroner (If death)	
Advise SES and other resources			
Field Search Headquarters			
Set up Field Search Headquarters		Suitable location	
Access		Parking	
Transport		Communications	
Facilities		Equipment	
Missing Person Locations			
Confirm Initial Planning Point IPP		Last Known Point LKP	
Point Last Seen PLS			
Lost Person behaviour LPB			
Establish distances		Characteristics	
Likely search areas		Medical considerations	
TFFS		POM	
Mapping			
Suitable maps		Mark IPP, LKP, PLS	
Areas searched		Areas to be searched	
SITREPS:			
To local command		SAR Command	
OIC		Media	
NOK		Other agencies	
Planning:			
Identify Operations Commander (Liaise with same)		Identify SMC	
Search appreciation conducted		Designate sub roles	
2IC		Planning member	
Intelligence member		Log keeper	
Communications member		Logistics member	

Land SAR Checklist			
Consider Criminal Investigation Branch if suspicious		NOK Liaison officer	
Establish White Board		Establish Communications Plan	
Updated weather information		Mapping/tasking	
Identify search areas (Manageable in 4-6hrs)		Consider Mattson Consensus	
Allocate Operational periods for future taskings		Rescue Plan	
Allocate resources to teams		Brief Search Personnel	
Team leader Briefings			
SMEAC		Emphasise clues	
Calling method		Description/clothing	
Search method		SITREP requirements	
Questions? Understood		Rescue Plan	
Actions on			
SITREPS:			
To local command		SAR Command	
OIC		Media	
NOK		Other agencies	
Search patterns			
FAST Teams		Static Teams (SES Light trailer)	
Road Blocks		Patrols	
Track Traps		Broad Sweeps	
Sound Sweeps		Night Search	
Contact Search		Line (Parallel) Search	
Records			
Action log		Equipment issued log	
Radio log		Search team records	
Personnel records- Attendances		Intelligence Records	
Update Map/Chart/white boards		Daily summary of personnel	
Debrief			
Thoroughness of search		POD	
Mark searched areas on map		Team leader to sign search record	
Clues		Further areas to search	
Issues raised		Download GPS information	
Manage welfare			
Future Issues			
Allocate time callout for more resources		Search/rescue plans	
Evacuation plan		Operational periods	
Change over of staff/SMC		Equipment/fuel	
Conclusion of SAR Operations -			
<i>At the conclusion of a SAR operation due to a target being located or the operation is suspended when a target is not located, the designated SMC should consider the following points and determine the correct course of action.</i>			
Confirm information is accurate and target has been located			<input type="checkbox"/>

Land SAR Checklist	
Alert all SRU – Stand down units	<input type="checkbox"/>
Sign in all members and document any injuries	<input type="checkbox"/>
All appropriate agencies notified	<input type="checkbox"/>
Sitrep to local command	<input type="checkbox"/>
Log assets / resources <i>Equipment repair & return</i>	<input type="checkbox"/>
NOK Notified <i>Insure they are updated regularly.</i> <i>Appoint a liaison member</i> <i>Ensure active participation in process were possible</i> <i>Prepare NOK for suspension decision at least one day prior</i>	<input type="checkbox"/>
Consider bringing in coroner or coroner's assistant	<input type="checkbox"/>
Involve Police Investigators early - If M/P not located	<input type="checkbox"/>
Consult Doctor – private and independent	<input type="checkbox"/>
Media release <i>Ensure you communicate correct message if SAR suspended.</i> <i>Seek advise from Police Media liaison unit</i> <i>Consider signs or pamphlets left in area – if target not located</i>	<input type="checkbox"/>
Debrief the MP – document / consider taping	<input type="checkbox"/>
Review who has command – If SMC leaving area	<input type="checkbox"/>
Hazards I.D eg. abandoned vessel – advised shipping	<input type="checkbox"/>
Records collated and filed	<input type="checkbox"/>
If target not located – Document reasons for suspension <i>Document by - police statement or Specific suspension of SAR documentation</i> <i>Signed off by district officer or higher</i>	<input type="checkbox"/>
Administration / Financial procedures completed	<input type="checkbox"/>
Conduct & organize debriefs – Hot & Full	<input type="checkbox"/>
Ensure Debriefs documented – Action items identified <i>Improvements, what went well, further investigation, encourage feedback</i> <i>Designate actions items to specific members</i> <i>Full debrief with relevant team leaders within 2 weeks of conclusion</i>	<input type="checkbox"/>
Safety issues after search. Driving whilst tired / alcohol	<input type="checkbox"/>
Consider critical incident stress management issues	<input type="checkbox"/>
Letters of thanks to outside agencies <i>Certificates for good work</i>	<input type="checkbox"/>
Conduct review – conclusion or suspension of SAR operation <i>By SMC and independent member</i> <i>Examine search plan</i> <i>Review planning scenarios</i> <i>Confirm initial planning point</i> <i>Evaluated all intelligence</i> <i>Examine all calculations</i> <i>Consult other experts – Police/medical/RCC</i>	<input type="checkbox"/>

Land SAR Checklist			
<i>Review TFFS with all available information</i> <i>Quality and effectiveness of search</i> <i>Consult doctor - personnel and independent</i> <i>Coverage of all areas searched</i> <i>POD high as desired</i> <i>Can you justify what has been done or not done?</i> <i>Never assume anything – information must be confirmed</i>			
Consider – <i>Future Case study NATSAR</i> <i>Review NATSAR manual conclusion of SAR Operations Chapter 7</i> <i>Exercises in area</i> <i>Over flights by Helicopter</i>		<input type="checkbox"/>	
CONCLUSION OR SUSPENSION - NOT TERMINATION			
Resources			
RCC		Local Police	
Command Truck		Dog Squad	
Mounted Unit		Radio Techs	
Field Catering		Media Unit	
Psychologist		Forensic Unit	
Scenes of Crime Unit		RCC	
DACC		Ambulance	
SES		Fire Service	
Cave/Mine rescue		Salvation Army	
Surf Life saving		Volunteer Marine Rescue	
Coast Guard		Ski Patrol	
Customs		BOM	
Harbour master			

Appendix I

Lost Person Behaviour

Lost Person Behaviour (LPB) has been derived from many studies and statistics gathering from search and rescue groups in many countries of the world. It has been found that certain categories of missing persons tend to have similar characteristics with respect to being lost. These categories have been broken down into the following groups:

- a. Children 1-3 years of age
- b. Children 4-6 years of age
- c. Children 7-12 years of age
- d. Youths 13-15 years of age
- e. Despondents or Suicide
- f. Psychological Illness'
- g. Developmental Problems
- h. Alzheimer's and Dementia
- i. Hikers and Walkers
- j. Climbers
- k. Hunters

Definitions:

Children 1-3yrs: All children aged 1-3 years of age.

Children 4-6yrs: All children aged 4-6 years of age

Children 7-12yrs: All children aged 7-12 years of age.

Youths 13-15yrs: All teens aged 13-15 years of age.

Despondent: A person feeling or showing signs of profound hopelessness, dejection, discouragement and/or gloom. This includes depression and people who have expressed the intent to commit suicide. Not all despondent's are suicidal and similarly not all suicidal persons are despondent but they have similar characteristics and are therefore combined for SAR purposes.

Psychological Illness: This category covers persons suffering from a wide range of mental disorders that medically would not be used together. They include persons suffering from schizophrenia, paranoia, psychotic disorders and bipolar disorders. These disorders can be naturally occurring or artificially induced such as by substance abuse. This category does not include dementia.

Developmental Problems: Also called Mental Retardation or Intellectual disability is a combination of below average intellectual functioning, impairments in daily life (communication, self-care, social skills, work, safety, health) and was onset prior to the age of 18 years. This category also applies to persons suffering brain injuries after 18 years that exhibit the same symptoms.

Dementia: Dementia is the loss of memory, reason, judgement and language to such extent that it interferes with daily living. Dementia includes AIDS and Alcohol related dementia, Alzheimer's Disease, Down Syndrome, Early or Younger Onset Dementia, Fronto Temporal Lobar Degeneration, Vascular Dementia and Dementia with Lewy bodies. Dementia often results in severe disturbances in how a person perceives and interprets events, sights, and sounds around them.

Hikers and Walkers: This category includes day walkers, members of bush walking clubs, hill/fell walkers, multi-day hikers, trekkers, orienteers and other persons who purposefully enter the bush for recreational walking purposes. Mountaineers are included in the climbing category.

Climbers: This category includes day climbers (single day outings, bouldering, rock and cliff climbers, traditional climbers and sport climbers) and mountaineers (those who attempt prominent peaks or alpine travel).

Hunters: This category includes all forms of hunting (pigs, water buffalo, brumbies, game fowl, kangaroos, cattle) on land. There is insufficient data for a further breakdown.

These are the most common groups of missing persons likely to be the subject of a search in Australia.

There have been numerous studies on missing person behaviour with the most recent being Robert Koester's (ISRID) International Search and Rescue Incident database www.dbs-sar.com collating thousands of incidents, statistics and previous studies for an international database. This information is continually being analysed and updated with Koester currently dividing missing person statistics to eco regions around the world that will enable more defined distances of travel for particular areas such as Victoria, a temperate terrain, as opposed to Northern Territory a hot dry terrain. The only specific Australian project on missing person behaviour was the SARBAYES project which was completed by Charles Twardy: <http://sarbayes.org/natsar.pdf>. The current Australian data base for the entry of LPB details is: <http://goo.gl/OLZmW>

Overseas studies also look at other categories such as hunters, skiers and miscellaneous adults. The three main LPB studies used for this manual have been taken from the UK, USA and Canada. Although Australia has many links with the UK and the majority of our citizens have a British background we are a more mobile and active society more closely resembling Canada in our lost person behaviour. These tables have been prepared as a guide only and are a compilation of studies in the above countries. They represent the statistical properties and characteristics of missing persons and what could be expected of them when they are lost, but ultimately these are only probabilities, not certainties.

This information can be used as the basis of search planning when no other information is available. Obtaining a good profile of the target person will assist the SMC in determining whether that person/group fits into the known behavioural patterns of the various categories studied. If so then further planning can be carried out on the information contained within this section. The SMC must always be aware that not everyone will adhere to these profiles. As can be seen in the distances travelled, 80% are within a relatively small area while the last 20% of persons in each category tend to travel much greater distances.

The studies show what the majority will do, there will always be someone outside the box who will do the opposite of what is expected.

Children 1-3 years									
Characteristics: 1-3 year olds									
<ul style="list-style-type: none"> a. Have no concept of being lost. b. Navigational skills are non-existent c. Will wander aimlessly d. Will not often respond to commands or whistles. e. Will tend to find shelter, which increases their survivability. 									
Tendencies:									
<ul style="list-style-type: none"> a. Will often seek out a place of shelter. Thick bushes, tables, old vehicles or appliances, caves. b. Difficult to detect. c. Will rarely self-help or walk out. 									
Strategies:									
<ul style="list-style-type: none"> a. Urgent response b. Confinement is a low priority. c. Passive techniques are not often successful. d. Dogs may be helpful if used quickly. e. Checks of places of highest probability to be made initially. f. Teams to run main tracks and trails. g. May require getting down onto hands and knees to identify other less obvious tracks. 									
Where located statistically:									
<ul style="list-style-type: none"> a. Habitation 25% b. Building/shelter 25% c. Open ground 25% d. Fence line, hedge, wall 12% e. Water, water's edge 12% 									
% of category	10	20	30	40	50	60	70	80	95%
Distance from LKP (KM)	0.11	0.25	0.3	0.42	0.6	1.15	1.6	2.10	4.45

Children 4-6 years																											
Characteristics: 4-6 year olds																											
<ul style="list-style-type: none"> a. Have an idea of being lost and will endeavour to return to home or to a familiar place. b. Will panic, which may cause them to become further lost. c. Explorations are usually one way, as a result of not comprehending to need to make a return journey. d. Will tend to remain on tracks or what they perceive as tracks. Not always visible to taller adults. e. Are considerably more mobile than smaller children. f. May have been following an adult or animal prior to getting lost. 																											
Tendencies:																											
<ul style="list-style-type: none"> a. Will often seek out a place of shelter. Thick bushes, tables, old vehicles or appliances, caves. b. Difficult to detect. c. Will rarely self-help or walk out. 																											
Strategies:																											
<ul style="list-style-type: none"> a. Urgent response b. Confinement is a low priority. c. Passive techniques are not often successful (Consider nicknames). d. Dogs may be helpful if used quickly. e. Checks of places of highest probability to be made initially. f. Teams to run main tracks and trails. g. May require getting down onto hands and knees to identify other less obvious tracks. 																											
Where located statistically:																											
<table border="0"> <tr> <td style="padding-right: 20px;">a.</td> <td>Habitation</td> <td style="text-align: right;">28%</td> </tr> <tr> <td>b.</td> <td>Building/shelter</td> <td style="text-align: right;">27%</td> </tr> <tr> <td>c.</td> <td>Road, linear</td> <td style="text-align: right;">19%</td> </tr> <tr> <td>d.</td> <td>Bush, scrub</td> <td style="text-align: right;">11%</td> </tr> <tr> <td>e.</td> <td>Open ground</td> <td style="text-align: right;">8%</td> </tr> <tr> <td>f.</td> <td>Water, water's edge</td> <td style="text-align: right;">7%</td> </tr> </table>										a.	Habitation	28%	b.	Building/shelter	27%	c.	Road, linear	19%	d.	Bush, scrub	11%	e.	Open ground	8%	f.	Water, water's edge	7%
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c.	Road, linear	19%																									
d.	Bush, scrub	11%																									
e.	Open ground	8%																									
f.	Water, water's edge	7%																									
% of category	10	20	30	40	50	60	70	80	95																		
Distance from LKP (KM)	0.1	0.21	0.48	0.75	0.95	1.3	1.68	2.57	5.47																		

Children 7-12 years											
Characteristics:											
<ul style="list-style-type: none"> a. Have developing navigational skills. b. Are developing mental pictures of their environments, which are often inaccurate and highly distorted. c. Often become lost while attempting a short cut. d. Often become lost while 'role playing' or adventuring. e. Often become upset upon being lost and will act irrationally. f. May attempt to track run which can take them further from their LKP. g. Will act more rationally if with a friend or sibling. h. Will often attempt to self-help, not always successfully. 											
Tendencies:											
<ul style="list-style-type: none"> a. Will mostly stay on tracks or trails. b. May seek out favourite places, hideouts etc, check with friends c. May seek out known landmarks, lookouts, high points, places they have been to in the past, lakes, ponds, areas where vegetation changes such as forest edges. 											
Strategies:											
<ul style="list-style-type: none"> a. Urgent response b. Confinement is a high priority c. FAST and Reconnaissance teams to highest probability areas. d. Use dogs if available e. Passive techniques are not often successful. 											
Where located statistically:											
	a.	Habitation								28%	
	b.	Building/shelter								27%	
	c.	Road, Linear								19%	
	d.	Forest/woods								11%	
	e.	Open ground								8%	
	f.	Water, water's edge								7%	
% of category			10	20	30	40	50	60	70	80	95
Distance from LKP (KM)			0.23	0.47	0.85	1.39	1.98	3.00	4.05	5.15	10.2

Youth 13-15																											
Characteristics:																											
<ul style="list-style-type: none"> a. Moderately developed navigational skills b. Often become lost as part of a group engaged in exploring. c. Don't often travel far. d. Often respond to attractant techniques. e. Often seek familiar locations by direction sampling. f. Will act more responsibly as part of a group. g. Will often attempt to self-help. h. May panic if alone 																											
Tendencies:																											
<ul style="list-style-type: none"> a. Will mostly stay on tracks or trails. b. May seek out favourite places, hideouts etc, check with friends c. May seek out known landmarks, lookouts, high points, places they have been to in the past, lakes, ponds, areas where vegetation changes such as forest edges 																											
Strategies:																											
<ul style="list-style-type: none"> a. Urgent response b. Confinement is a low priority unless MP is alone c. FAST and Reconnaissance teams to highest probability areas. d. Use dogs if available e. Passive techniques are not often successful. 																											
Where located statistically:																											
<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 5%;">a.</td> <td style="width: 75%;">Habitation</td> <td style="width: 20%;">24%</td> </tr> <tr> <td>b.</td> <td>Stream/waterway</td> <td>22%</td> </tr> <tr> <td>c.</td> <td>Building/shelter</td> <td>21%</td> </tr> <tr> <td>d.</td> <td>Forest/ woods</td> <td>11%</td> </tr> <tr> <td>e.</td> <td>Road, Track</td> <td>11%</td> </tr> <tr> <td>f.</td> <td>Forest edge or clearing</td> <td>11%</td> </tr> </tbody> </table>										a.	Habitation	24%	b.	Stream/waterway	22%	c.	Building/shelter	21%	d.	Forest/ woods	11%	e.	Road, Track	11%	f.	Forest edge or clearing	11%
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d.	Forest/ woods	11%																									
e.	Road, Track	11%																									
f.	Forest edge or clearing	11%																									
% of category	10	20	30	40	50	60	70	80	95																		
Distance from LKP (KM)	0.5	1.1	1.47	1.85	2.2	3.03	3.79	4.37	14.43																		

Despondent									
Characteristics:									
<ul style="list-style-type: none"> a. Don't often travel far, but intent to be alone b. Often located a border of two types of terrain and/or vegetation boundary c. May head for a scenic location or well-known beauty spot. d. Locations are often well known to MP, check with family e. Rarely located in dense underbrush or trees. f. Rarely respond to call and whistles and may hide. g. Very high fatality rate h. Drugs and/or alcohol often involved. 									
Tendencies:									
<ul style="list-style-type: none"> a. Go to high points or scenic locations. b. Well known or favourite places. c. Terrain interfaces d. Group 1- merely seeking to get out of sight. e. Group 2-will seek out a specific location, significant to their life. f. May travel further. 									
Strategies:									
<ul style="list-style-type: none"> a. Investigation important b. Obtain a good subject profile from family and friends. c. Urgent response d. Thorough search of a small area e. Confinement is a low priority f. Passive techniques not successful 									
Where located statistically:									
<ul style="list-style-type: none"> a. Habitation 26% b. Water/water's edge 24% c. Forest/woods 16% d. No trace 13% e. Road 11% f. Forest edge/clearing 9% 									
% of category	10	20	30	40	50	60	70	80	95
Distance from LKP (KM)	0.14	0.33	0.56	0.87	1.18	1.76	2.43	3.22	18.14

A small percentage of all persons who go missing do so with the intent of committing suicide. The reasons for this are beyond the scope of this document but a wide and varied. The SMC should consider whether the MP is genuinely at risk of taking their own lives and what strategy should be used. Studies have shown that there is a strong link between depression and suicide. The two strongest indicators that a depressed person may contemplate suicide are:

- a. They have left a suicide note indicating their intentions of taking their own lives.
- b. They have recently talked about taking their own lives.

The SMC needs to obtain a detailed profile of the target person. There is often something in their background that is either the cause or trigger for them to contemplate suicide. Problems to look for are:

- Relationships
- Finances
- Sexual
- Employment
- Education
- Medical
- Mental health
- Addictions

If someone who is suffering depression has indicated an intention to take their own life, and has one or more of the above triggers present, there is a high probability that the person poses a high risk of taking their own life. The risk is normally low pre teens and increases during puberty and adolescence, reaching a peak in the mid twenties and remaining relatively constant until old age.

Religious conviction may be an indicator of suicide intent. Strongly Christian believers are less likely to commit suicide. Those with no religious beliefs have a high tendency towards suicide. In some religions, such as Judaism, Islamic, Hindu, Shinto, suicide is a valid way to depart earth.

If there is a suicide note, the contents may provide important information regarding where and how the person intends to suicide. It may provide specific information about a favourite or known location. It may also indicate that they will not be found which may point out that they will be in a secluded or difficult to reach location. The presence of a note does not automatically mean that the target has committed suicide as some people sue these notes for shock tactics to get attention or they change their minds and not follow through.

Gender is very important in determining whether suicide is a possibility. Men are three times more likely to take their own lives than women (ABS 2012). Men, 18-45, are the greatest at risk. Within the men group Aboriginal and Islander males are at a higher risk than average. Hanging is the most popular method (51%), with poisoning by drugs (15%) and poisoning by other methods such as car exhaust (16%) following. Jumping from high buildings, drowning, firearms etc account for the remainder. Married men are less likely to commit suicide.

Once a person has reached the decision to commit suicide they generally want to carry it out as soon as possible for the least amount of effort. Access to the means to do so should be investigated by the SMC as this may determine how and where it may take place.

There are many recorded instances where an adult has gone missing with their children. The killing of the children prior to suicide is not uncommon.

With the increased mobility of today's young people it is often difficult to obtain sufficient details of a missing person because they have not established a close circle of friends. Computer sites such as 'YouTube', 'Face Book' and 'My space' may provide details about a missing person and any intentions that they may have.

Psychological Illness									
Characteristics:									
<ul style="list-style-type: none"> a. May be evasive and run or hide b. Often not respond to their name c. Rarely travel purposely to a target d. Medication or lack of it may be a problem. e. May be frightened of authority and of being found f. Can be aggressive g. Not actually lost in the normal sense. h. Difficult to predict behaviour 									
Tendencies:									
<ul style="list-style-type: none"> a. Do not often penetrate forest or thick undergrowth b. Will seek shelter and seclusion c. May walk out when ready 									
Strategies:									
<ul style="list-style-type: none"> a. Check all buildings and places of shelter/seclusion b. Check drains, streams and tracks. c. Obtain profile by talking to family, friends and medical experts. d. Dogs may be of use. e. Containment a priority f. Re-search areas and tracks g. On going search of buildings as target may return to areas already searched. 									
Where located statistically:									
<ul style="list-style-type: none"> a. Road, Linear 29% b. Habitation 19% c. Building/shelter 14% d. Stream 14% e. No trace 9% f. Open ground 9% 									
% of category	10	20	30	40	50	60	70	80	95
Distance from LKP (KM)	0.22	0.45	0.71	0.98	1.23	2.25	3.47	4.7	11.73

Developmental Problems									
Characteristics:									
<ul style="list-style-type: none"> a. lack the concept of being lost b. Cross between young children and Alzheimer's. c. Generally good survivability d. Do not often respond to names or other signals. e. May also have a physical impairment. f. Rarely travel to a specific target but will seek shelter g. Will often penetrate thick forest and undergrowth h. Will often run away and avoid searchers. 									
Tendencies:									
<ul style="list-style-type: none"> a. Not route orientated. 									
Strategies:									
<ul style="list-style-type: none"> a. High urgency b. Obtain profile from family c. Dogs may assist d. Detailed ground search e. Check streams and drains f. Re searching areas is important. g. Check buildings etc ongoing. 									
Where located statistically:									
<ul style="list-style-type: none"> a. Building/shelter 40% b. Road, Linear 30% c. Forest 20% d. No trace 6% e. Open ground 4% 									
% of category	10	20	30	40	50	60	70	80	95
Distance from LKP (KM)	0.23	0.46	0.83	1.34	1.85	2.88	3.9	5.02	23.9

Alzheimer's/Dementia																																																																															
Characteristics:																																																																															
<ul style="list-style-type: none"> a. Poor short term memory but may remember things that happened many years ago, such as address while a child. b. Impaired ability to rationalise surroundings. c. Often last seen in their home or a nursing home. d. May have a previous history of wandering e. Other physical problems may exist (Limited mobility, poor sight or hearing) f. May be seeking a secluded location g. Will not attract attention or respond to calls. h. Possible not concept of being lost i. Will not often leave any clues apart from paradoxical undressing. j. Often succumbs to the environment (Hypothermia etc) k. 25% fatality rate if not located within first 24hrs l. Two types, walkers and non walkers 																																																																															
Tendencies:																																																																															
<ul style="list-style-type: none"> a. Often located a short distance from a road or path. b. Will often attempt to travel to a place previously known to them. c. Will be stopped by fences, hedges etc. d. Will tend to walk on the path of least resistance, downhill, and not often uphill. e. Can be found in drains or streams due to the low levels. f. May remove items of clothing 																																																																															
Strategies:																																																																															
<ul style="list-style-type: none"> a. High urgency b. Early containment is essential c. Use dogs or trackers d. Check all drains and low lying areas. e. Check all fences, hedges and private yards in vicinity f. Thorough search of the house, nursing home, and repeat every few hours. g. Search heavy bush h. Search previous home locations. 																																																																															
Where located statistically:																																																																															
<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 15%;">a. Habitation/ structure</td> <td style="width: 15%;"></td> <td style="width: 15%;">35%</td> <td colspan="7"></td> </tr> <tr> <td>b. Road</td> <td></td> <td>35%</td> <td colspan="7"></td> </tr> <tr> <td>c. Water</td> <td></td> <td>10%</td> <td colspan="7"></td> </tr> <tr> <td>d. Open ground</td> <td></td> <td>6%</td> <td colspan="7"></td> </tr> <tr> <td>e. No trace</td> <td></td> <td>5%</td> <td colspan="7"></td> </tr> <tr> <td>f. Forest</td> <td></td> <td>4%</td> <td colspan="7"></td> </tr> <tr> <td>g. Clearing</td> <td></td> <td>3%</td> <td colspan="7"></td> </tr> </tbody> </table>										a. Habitation/ structure		35%								b. Road		35%								c. Water		10%								d. Open ground		6%								e. No trace		5%								f. Forest		4%								g. Clearing		3%							
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Distance from LKP (KM)	0.19	0.39	0.64	0.97	1.28	1.90	2.53	3.2	10.32																																																																						

Hikers/Walkers									
Characteristics:									
<ul style="list-style-type: none"> a. Often track orientated but become disoriented if they miss their track junctions or it is overgrown and not easily found. b. Tend to travel further than other categories. c. At times poorly prepared or experienced for type of walk. d. Will often attempt to self-help by track running or seeking a high spot. e. May follow paths of least resistance, such as streams and forest boundaries. f. May panic and be irrational g. May look for shelter in poor weather, at nightfall or if injured. h. May seek higher ground to attempt a reorientation i. May seek higher ground to gain mobile telephone reception 									
Tendencies:									
<ul style="list-style-type: none"> a. Stay on tracks b. Seek shelter c. Seek high ground 									
Strategies:									
<ul style="list-style-type: none"> a. Containment b. FAST and Reconnaissance teams to high probability areas. c. Track searches. d. Obtain profile and route details e. Being clue aware. f. Be aware of the potentially large distances the MP could have walked. 									
Where statistically located:									
<ul style="list-style-type: none"> a. Road, Linear 48% b. Stream 27% c. Building/shelter 10% d. Fence 4% e. Forest edge 3% f. Forest 3% g. Open ground 1% h. Water 1% 									
% of category	10	20	30	40	50	60	70	80	95
Distance from LKP (KM)	0.45	0.92	1.41	1.99	2.56	3.15	4.31	5.76	15.15

Hunters				
Characteristics:				
<ul style="list-style-type: none"> a. Often game focused, which tends to contribute to their being lost. b. Will not often acknowledge that they are lost. c. Following targets often leads them to deadfall areas, boulder fields, underbrush or dense forest. d. Will go to great lengths to self-help. e. Will sometimes avoid searchers for fear of embarrassment. f. Often rely on GPS, radios and mobile phones. g. Usually mobile and responsive. h. Tend to travel at night and will follow linear features. i. Will take easy routes, ridge lines, cross country. j. Will make shelter and fire where possible. 				
Tendencies:				
<ul style="list-style-type: none"> a. Will attempt to self help b. Seek shelter c. Seek high ground 				
Strategies:				
<ul style="list-style-type: none"> a. Containment b. FAST and Reconnaissance teams to high probability areas. c. Use of attraction techniques. d. Check historical finds e. Air searches. f. Be aware of the potentially large distances the MP could have walked. 				
Where statistically located:				
<ul style="list-style-type: none"> a. Road 52% b. Forest 10% c. Building/shelter 9% d. Stream 9% e. Water 8% f. Ridges 6% g. Open ground 3% h. Rocks 3% 				
% of category	25%	50%	75%	100%
Distance from LKP (KM)	0.96	2.09	4.82	17.2

Climbers				
Characteristics:				
<ul style="list-style-type: none"> a. Will often travel considerable distances to reach climb site. b. Generally well equipped but beginners may attempt difficult climbs without adequate equipment. c. Often overdue because of over estimation of climbing ability (39%). d. May be caught out in bad weather (24%) e. Being lost is not common (17%). f. Being stuck because of weather is common. g. Trauma is often experienced (Rocks falling on them or others). h. Will often be lost going to and from the climb site. i. Some climbers are stranded by nightfall (12%) and can not go up or down. 				
Tendencies:				
<ul style="list-style-type: none"> a. Will attempt to self help b. Seek shelter c. Seek high ground 				
Strategies:				
<ul style="list-style-type: none"> a. Containment b. FAST and Reconnaissance teams to high probability areas and tracks. c. Use of attraction techniques. d. Snow/Avalanche search if necessary e. Thorough search of 25% zone f. Climbing location is the immediate area g. Check other climbs and routes in area. 				
Where statistically located:				
<ul style="list-style-type: none"> a. Scrub 40% b. Water 27% c. Rocks 27% d. Road 20% e. Ridges 18% g. Open ground 9% h. Stream 9% i. Forest 9% 				
% of category	25%	50%	75%	100%
Distance from LKP (KM) Day climber	0.0	0.3	0.8	1.8
Mountaineer	0.1	1.0	3.0	10.5

Appendix J

Land Search Planning Tables

1. Select speed of Searcher:

Search member speed kph	
5kph	Consistent walking pace, undulating ground, light vegetation
4kph	Steady walking pace partly restrained by vegetation and topography
3kph	Walking pace restrained by vegetation and topography
2kph	Slow walking pace considerably restrained by vegetation and topography
1kph	Dead slow walk severely hampered by vegetation and topography

2. Select search spacing (in kph):

Searcher spacing	
50m (0.05km)	Open grassland or pasture
40m (0.04km)	Open grassland interspersed with light shrubbery
30m (0.03km)	Open country with low lying scrub and light undergrowth
20m (0.02km)	Heavier scrub, medium undergrowth
15m (0.015km)	Heavy scrub, undergrowth to shoulder height
10m (0.01km)	Heavy shrub, dense undergrowth
5m (0.005km)	Ground visual between searchers
2.5m (0.002km)	Dense undergrowth, ground visual

3. Then calculate: Velocity = Number of searchers x speed in kph.

4. Then calculate Area = Time x Velocity x Spacing

$$A = T \times V \times S$$

$$T = A \div (V \times S)$$

$$V = A \div (T \times S)$$

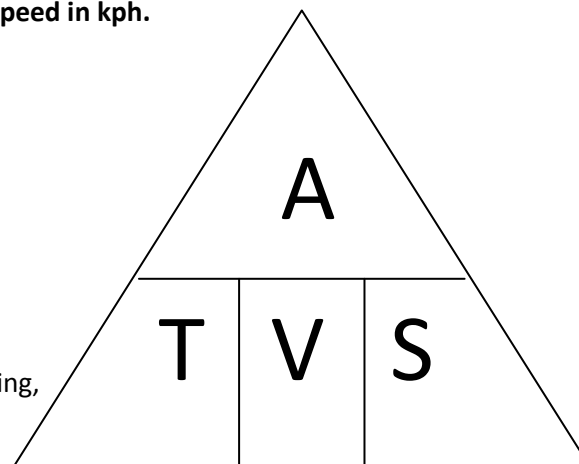
$$S = A \div (V \times T)$$

Eg: What area could I search with 20 personnel, at 5m spacing, walking at 2kph in 3 hours?

$$A = T \times V \times S$$

$$A = 3\text{hrs} \times (20 \times 2\text{kph}) \times 0.005\text{km}$$

$$A = 0.6\text{km}^2$$

**Search Area Quick Reference.**

Eg At 1kph and 5m spacing = 0.005km²/searcher/hour

Speed	Area covered in km ² at track spacing of:							
	2.5m	5m	10m	15m	20m	30m	40m	50m
1	0.0025	0.005	0.01	0.015	0.02	0.03	0.04	0.05
2	0.005	0.01	0.02	0.03	0.04	0.06	0.08	0.1
3	0.0075	0.015	0.03	0.045	0.06	0.09	0.12	0.15
4	0.01	0.02	0.04	0.06	0.08	0.12	0.16	0.2
5	0.0125	0.025	0.05	0.075	0.1	0.15	0.2	0.25

Air Search Planning Table

Uncorrected Sweep width (Wu) for visual search OVER LAND. 'Wu' is in kilometres for this table (Pilots will be able to convert back to NM if necessary).

Search Height (ft)	Human					Vehicle					
	0	500	1000	1500	2000	0	500	1000	1500	2000	
Visability	2km	-	0.75	0.75	-	-	0.93	1.11	1.3	1.11	0.93
	5km	-	0.75	0.75	-	-	1.3	1.66	2.78	3.15	3.7
	10km	-	0.75	0.75	-	-	1.66	2.40	2.78	3.15	3.7
	15km	-	0.93	0.75	-	-	1.66	2.40	2.78	3.15	3.7
	20km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	25km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	30km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	35km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	40km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	55km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	75km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7
	90km	0.75	1.11	0.93	0.75	0.75	1.66	2.40	2.78	3.15	3.7

Vegetation Correction Factor (Ve)

Vegetation	Human	Vehicle
Less than 15% (Open areas or scattered shrub)	0.8	1.0
15% to 60% (Medium scrub or forest)	0.5	0.7
60% to 85% (Dense scrub or forest)	0.3	0.4
Over 85% (Rain forest)	0.1	0.1

Cloud cover correction factor: Shadows cast by scattered and broken clouds are a distracting influence on observers. Compensate for this by rounding down the corrected sweep width when the sky is partially obscured.

Eg. Target is a missing person, Vis = 20km, Search height is 1000ft, vegetation is 15-60%

$$\text{Corrected Sweep Width}(W) = W_u \times V_e$$

$$W = 0.93 \times 0.5$$

$$W = 0.465\text{km}$$

Most Common Applications:

Land searching for

1. Missing person in relatively open terrain =
(Farming country, desert areas) SEARCH HEIGHT 500ft
TRACK SPACING 500m
2. Missing vehicle in relatively open terrain = SEARCH HEIGHT 2000ft
TRACK SPACING 3km

Appendix K

Additions to Naismith's Rule:

Land Speed/Time Calculations		
Terrain	Speed	Per minute equivalent
Road	5kph	100m each 1.2 minutes
Track	4kph	100m each 1.5 minutes
Trail	3kph	100m each 2.0 minutes
Off Track	2kph	100m each 3.0 minutes
Scrub	1kph	100m each 6.0 minutes
Ascending: Add 1.2 minutes per 100m for overall time taken (Equivalent to 1hr every 500m ascent)		
Descending: Add 0.6 minutes per 100m for overall time taken (Equivalent to 1hr every 1000m descent)		
Fatigue		2 hours add 10 minutes 3 hours add 25 minutes 4 hours add 40 minutes 5 hours add 60 minutes

In the past three decades much work has been devoted to modifying Naismith's rule to meet modern conditions. One such system is to utilise Naismith's Rule to calculate a time then apply Tranter's Corrections when working out a possible search area.

Time taken to climb 300m in 800m																
Individual fitness in minutes	Times taken in hours estimated using Naismith's Rule															
	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24
15 very fit	1	1.5	2	2.25	3.5	4.5	5.5	6.8	7.8	10	13	14.5	17	19.5	22	24
20	1.25	2.25	3.25	4.5	5.5	6.5	7.75	8.8	10	13	15	17.5	20	23		
25	1.5	3	4.25	5.5	7	8.5	10	12	13	15	18					
30	2	3.5	5	6.75	8.5	10.5	12.5	15								
40	2.75	4.25	5.75	7.5	9.5	11.5										
50 unfit	3.25	4.75	6.5	8.5	Too much to be attempted											
Limit line																

The fitness level in the first column is the time it takes to climb 300m in 800m and can be determined through series of trials.

The following corrections to Tranter's Corrections should also be made for the following conditions:

20kg load being carried	Drop one fitness level
Conditions underfoot	Drop one level or more according to conditions
Conditions overhead	Drop one level for journey at night or if wind is blowing against you

Appendix L

Probability of Detection (Land)

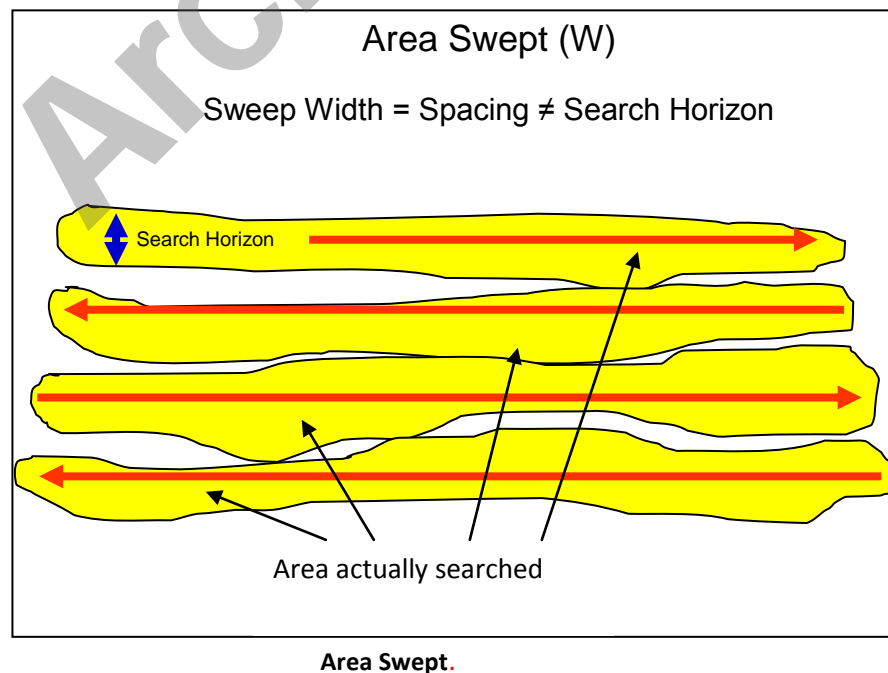
Caveat: POD for land is a new concept within Australia. It is more common in Canada, UK and New Zealand. The theory behind this is based on the Marine POD. The theory and mathematics is scientifically sound though has yet to be tested in a legal situation within Australia.

Area of Search: Area of Search (S) is the actual area, in square kilometres, to be searched by a particular team. The desired effective sweep width is a function of detection capability. The more difficult the target to detect, the closer the searchers should be. Decreasing the sweep width increases the POD, but at the expense of reducing the area searched in a given time. There is a limit to which S may be reduced due to the limits of search unit navigation ability and accuracy. The optimum sweep width is one which permits the maximum expectation of target detection in the available time, or is consistent with the economic employment of search units. Whenever possible the Area Searched (W) used should be equal to the Area of Search (S)

Coverage Factor (C): The coverage for a land search is a relationship between Area Swept and the Area of Search. The relationship is termed Coverage Factor.

$$\text{Coverage Factor (C)} = \frac{\text{Area Swept (W)}}{\text{Area of Search (S)}}$$

The relationship between Area Swept and the Area of Search determines the Probability of Detection (POD). The area swept is the actual area that was covered by the searchers, while the area of search is the area given to that team to search. Higher coverage factors indicate that a search has been thorough and offer a higher probability of target detection, however the higher POD is not proportional to the extra search effort required. Where possible the SMC should be aiming for a coverage factor of 1. This means that the actual area searched will equal the area that had to be searched. There will be many occasions when terrain, time limitations, large search area, or shortage of searchers will prevent this. These situations will need an alternative approach that balances the factors of available search hours, size of area and C.



A coverage factor of less than 0.5 may be unsatisfactory.

Probability of Detection (POD): Probability of detection (POD) is the statistical measure of search detection performance. It is a function of Area Swept and the Area of Search and is also conditional meaning that search planners assume the search target is in the search area. A definite POD exists for each scan made by a searcher. The probability that a contact will be made in a single scan of a point on the surface is called the instantaneous POD. The instantaneous POD, repeated by successive scans as the search unit moves along the track, develops the probability pattern of a given search. The POD is not uniform over the swept area. In general, it is highest near the searcher and decreases with distance from the searcher. Although POD is based upon each searcher the end calculation will pertain to the entire team. POD is a function of the coverage factor (C), which itself is derived from the relationship of Area Swept and the Area of Search. Increasing search areas for second and subsequent searches of a particular location will have the effect of increasing the cumulative POD. The application of this concept results in a progressive increase in the POD of a target in the most likely sector of the search area by repeatedly searching the original area within progressively larger areas, a part of each overlaying the original. This thus results in an aggregate POD after successive searches of part of a probability area. It is not to be thought that early search effort should be restricted in anticipation of the benefits of the expanded search technique; these will take time to accrue, and time, in the rescue of survivors, is of the essence. Neither should a particular search be prolonged unnecessarily in similar anticipation. The concept of expanded search does allow flexibility in search planning in as much as the desired quality of search, if unattainable on account of limitations in the availability of search units, may be attained by repeated effort, while ensuring that the most likely area is rapidly and repeatedly covered. Utilising the land POD v Coverage Table below it can be seen that, when compared with marine SAR, there is only one search line which is to be used for all searches. A Coverage Factor (C) of 1.0 will give a POD of approximately 63%, whereas a Coverage Factor (C) of 0.5 will give a POD of approximately 40%. Some confusion may exist over this graph. If the area swept and the area of search is the same, the Coverage Factor (C) will be 1 or 63%. This is because there are always going to be gaps in where searchers search, refer to the Area Swept diagram on the previous page. The yellow areas are those searched while the white areas in between are those that were missed. In reality, a searcher has searched approximately 63% of the area assigned to them. The following example will make this clearer: There are 2 hours to search an area of 1km². There is a team of 10 personnel who will walk at 2kph with a space of 20 metres between searchers. (20m = 0.02km). All measurements need to be in the same terms, either metres or kilometres.

$$\text{Area Swept (A)} = \text{Time (T)} \times \text{Velocity (V)} \times \text{Spacing (S)}$$

$$\text{i.e. } A = TVS$$

$$A = 2\text{hrs} \times (10 \text{ searchers} \times 2\text{kph}) \times 0.02\text{km}$$

$$A = 0.8\text{km}^2$$

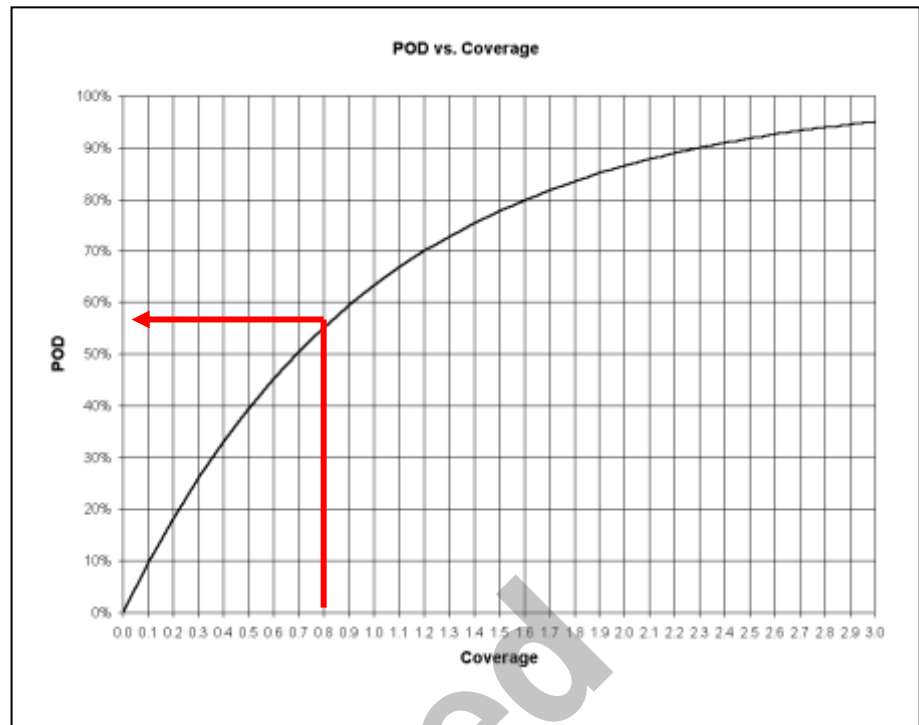
Coverage:

$$C = \text{Area Swept} \div \text{Area of search}$$

$$C = 0.8\text{km}^2 \div 1.0\text{km}^2$$

$$C = 0.8$$

This figure can now be used in a Land SAR POD Table as shown below. Using the 0.8 on the bottom line we arrive at a coverage figure of 56%. This is because land search is always a compromise between spacing and the ability to see objects on the ground. It is almost impossible to achieve a 100% POD for any land SAR.



Technically it is not possible to search an area greater than that assigned so how do you get a Coverage Factor (C) greater than 1? If you have a 2km² area to search and have the following: 2 hours, 10 searchers walking at 2kph and spacing of 50m.

Using the ATVS formula this will give a Coverage Factor (C) of 1

$$A = 2\text{hrs} \times 10 \text{ searchers} \times 2\text{kph} \times 0.05\text{km spacing} = 2\text{km}^2$$

$$C = 2\text{km}^2 \div 2\text{km}^2 = 1 = 63\%$$

If I increase the number of searchers by 5, but utilise them in the same area:

$$A = 2\text{hrs} \times 15 \text{ searchers} \times 2\text{kph} \times 0.05\text{km spacing} = 3\text{km}^2$$

$$C = 3\text{km}^2 \div 2\text{km}^2 = 1.5 = 78\%$$

Although the formula gives a larger area searched, in reality we have searched the original area to a greater extent, with the five extra searchers. We can increase either the time allowed to search an area or the number of searchers to increase the C. You can also increase the speed of the searchers or the spacing between them, which will also give an increased C by searching the same area more than once. (Twice the speed will double the area searched, or in our case, searching the same area twice, going up and back. The same will apply if the spacing is increased.) The Land Cumulative POD Table (At end of this appendix) shows that two searches with an initial C of 0.5 will combine to produce a total POD of 64%, which is equivalent to conducting one search with a C of 1.0. It can also be seen that as more searches are conducted within that particular search area the POD slowly increases, as would be expected. Two searches in a particular area can be worked directly off the Land Cumulative POD table with the first search POD being entered on the left and the second across the top. For a third search the cumulative POD for the first two searches is entered into the left side of the table and the new search POD across the top. Eg. Search 1 has a POD of 40%, search 2 has a POD of 50%. A cumulative POD for these two searches is 70%. Search 3 has a POD of 40%. Using the 70% from the first two searches on the left of the table and the new POD of 40% across the top a three search cumulative POD is 82%. This process is continued for each subsequent search. From the foregoing, it is apparent that for lengthy and repeated searches when searcher numbers are

limited, a coverage factor of 0.5 offers a reasonable coverage of an expanded area resulting, over time, in a good POD. Search of areas at a coverage factor less than 0.5 is not recommended. Statistically, the target is more likely to be nearer the last known position than in the extremities of the search area. Application of the expanded search concept ensures that the greatest search effort is concentrated over the most probable position of the target where the POD is highest. Clearly, the expanding search procedure is best suited to situations where the approximate position or, at least, the planned route of the target is known. The projected value of the POD may be used by a SMC in determining the area of search. Use of POD may also be conveniently made in describing the results of a search, or part of a search, to interested persons not familiar with search planning techniques. Should the target not be located within the entire search area, the SMC must decide whether to continue searching it, recalculate the probability area using alternative data, or recommend the suspension of search effort.

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Cumulative POD for Land Search

POD this search

Previous POD

%	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
5	10	15	19	24	29	34	38	43	48	53	57	62	67	72	76	81	86	91	95
10	15	19	24	28	33	37	42	46	51	55	60	64	69	73	78	82	87	91	96
15	19	24	28	32	36	41	45	49	53	58	62	66	70	75	79	83	87	92	96
20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96
25	29	33	36	40	44	48	51	55	59	63	66	70	74	78	81	85	89	93	96
30	34	37	41	44	48	51	55	58	62	65	69	72	76	79	83	86	90	93	97
35	38	42	45	48	51	55	58	61	64	68	71	74	77	81	84	87	90	94	97
40	43	46	49	52	55	58	61	64	67	70	73	76	79	82	85	88	91	94	97
45	48	51	53	56	59	62	64	67	70	73	75	78	81	84	86	89	92	95	97
50	53	55	58	60	63	65	68	70	73	75	78	80	83	85	88	90	93	95	98
55	57	60	62	64	66	69	71	73	75	78	80	82	84	87	89	91	93	96	98
60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98
65	67	69	70	72	74	76	77	79	81	83	84	86	88	90	91	93	95	97	98
70	72	73	75	76	78	79	81	82	84	85	87	88	90	91	93	94	96	97	99
75	76	78	79	80	81	83	84	85	86	88	89	90	91	93	94	95	96	98	99
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
85	86	87	87	88	89	90	90	91	92	93	93	94	95	96	96	97	98	99	99
90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	99	99
95	96	96	96	96	96	97	97	97	97	98	98	98	98	99	99	99	99	99	99

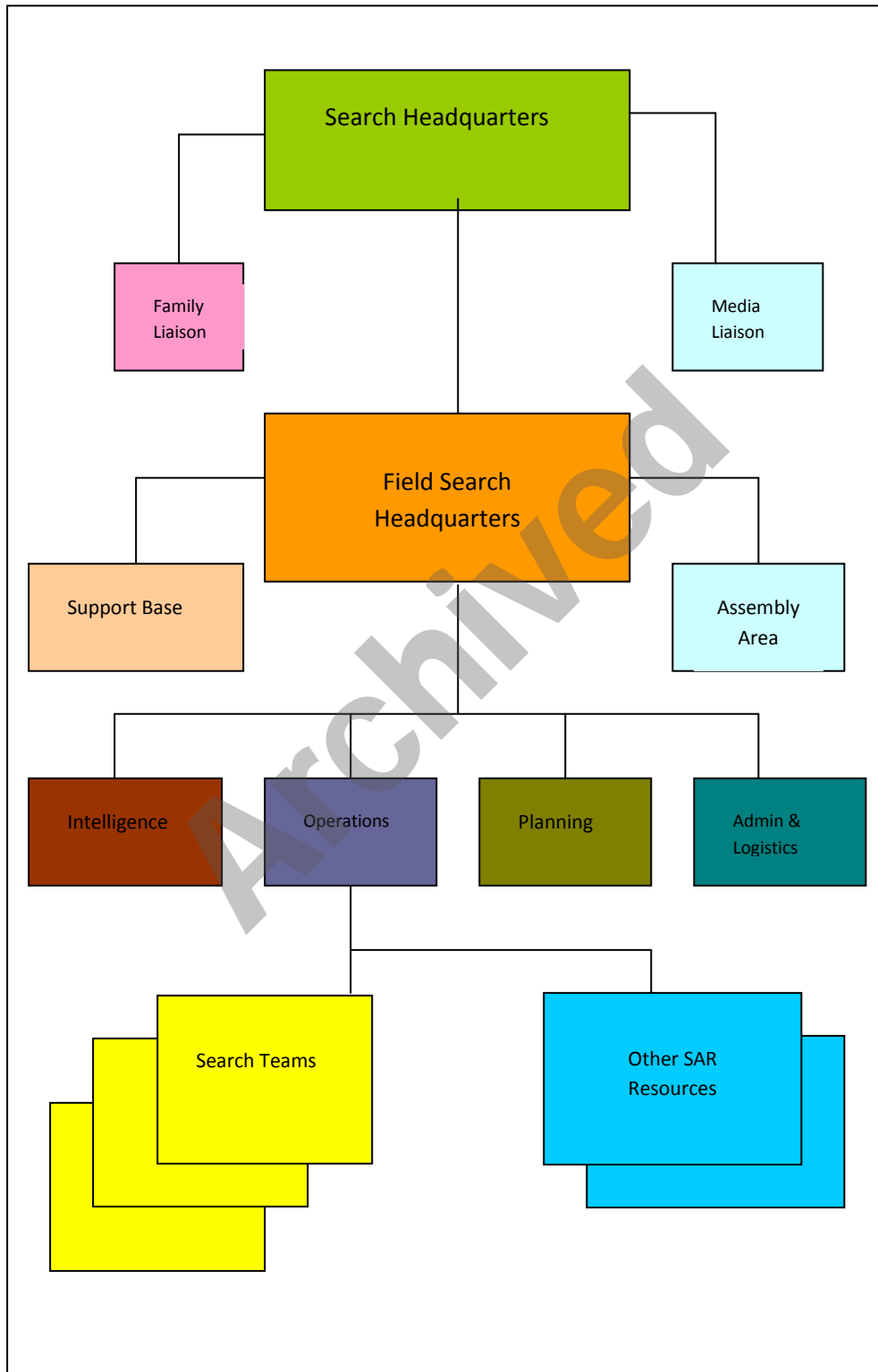
Appendix M

Mattson Consensus

Mattson Consensus Worksheet							
Search areas	Area A	Area B	Area C	Area D	Area E	ROW	Subtotal Across (2)
Name 1	10	12	30	10	5	2	69
Name 2							
Name 3							
Name 4							
Name 5							
Subtotal Down (1)	10	12	30	10	5	2	69
Consensus Weight (3). (1) ÷ (2) = weight	10/69 = 0.144	12/69 = 0.17	30/69 = 0.43	10/69 = 0.14	5/69 = 0.07	2/69 = 0.03	
Percentage = (3) x 100	15.00%	17%	43%	15%	7%	3%	100%

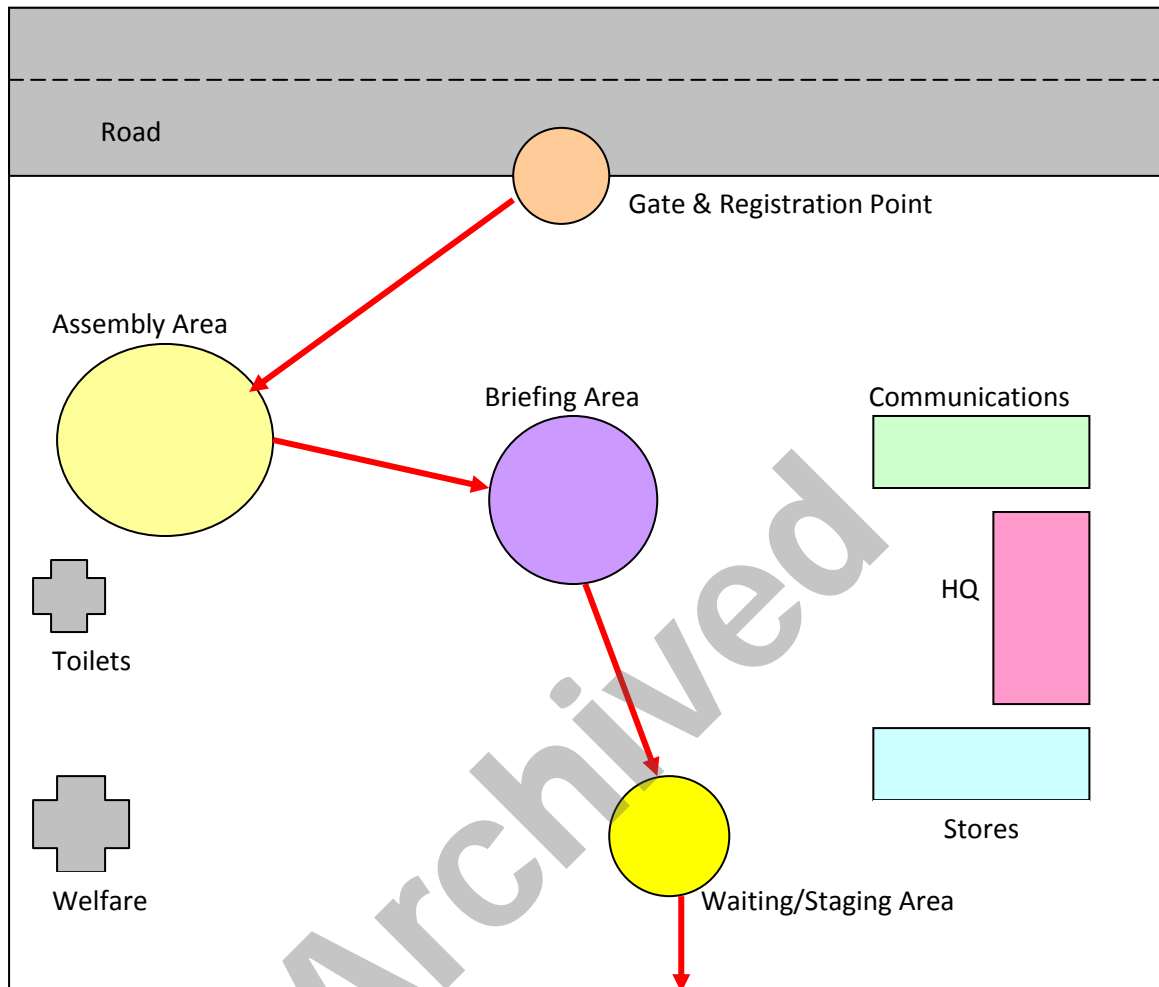
Appendix N

Land Search Organisation Chart



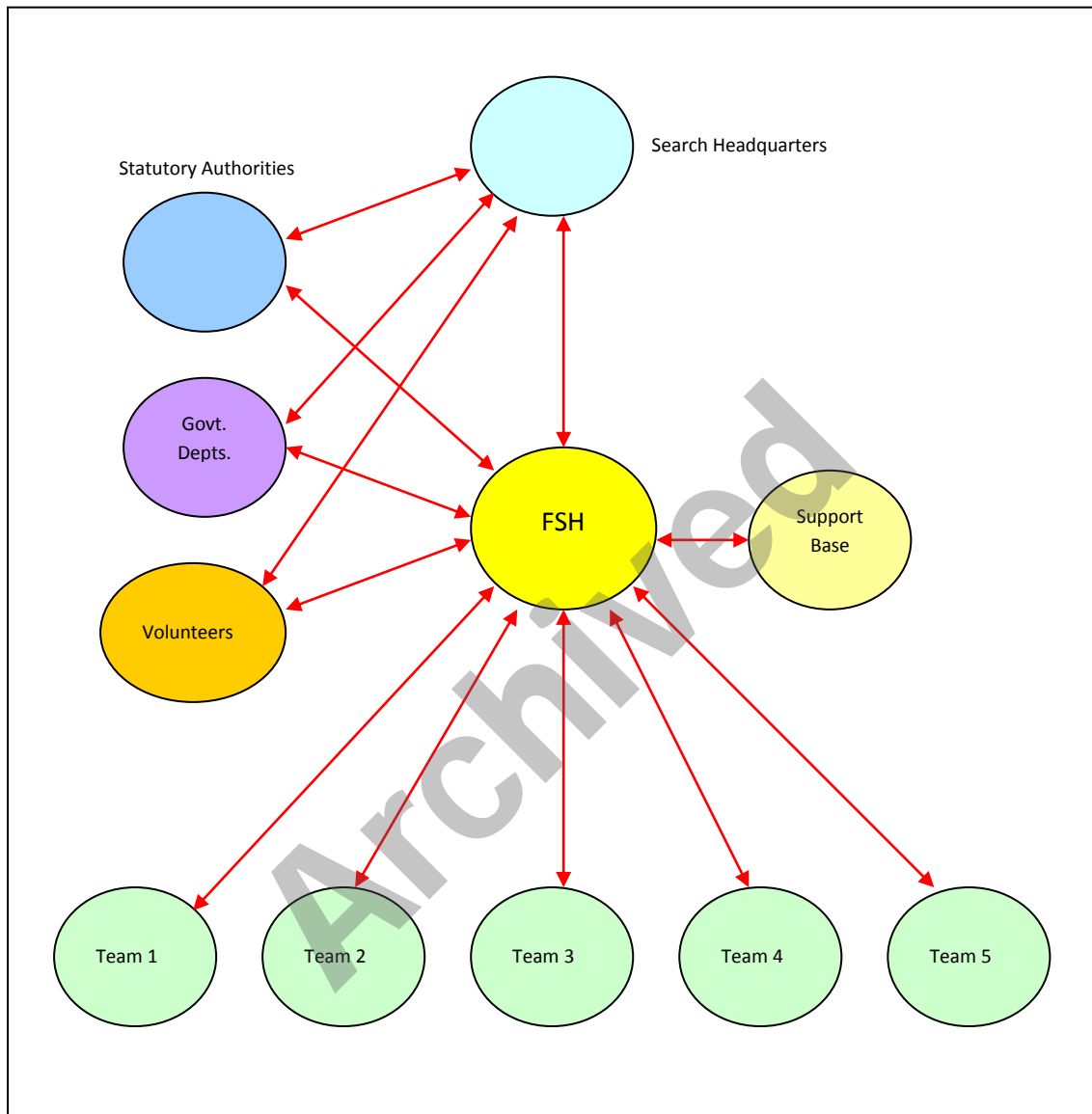
Appendix O

Headquarters Layout



Appendix P

Search Communications Net



Appendix Q

Clue Recognition

A clue is a fact, an object, information or some type of evidence that helps to solve a mystery or problem. The purpose of seeking clues (gathering all the facts and information) is to assist in the reasoning of a problem and its ultimate solution.

General Principles:

The following principles apply:

- Clue seeking is an ongoing process that starts with planning, continues throughout a mission and doesn't end until the debrief concludes.
- Clue seeking is a skill and must be practiced to develop a sense of what is the minimum information to work with.
- Avoid forming opinions and then gathering information to support that opinion.
- Don't immediately form an opinion about the value of a clue.
- Gather information from everyone, as no one person can adequately gather all the facts.
- Assemble a complete profile of the missing subject and the situation, and let it offer direction.

Tracking Skills.

The ability for searchers to recognise signs that are not obvious clues within their search area can dramatically reduce the duration of the search. These signs may be quite obvious to some searchers but may go unseen by others. Developing skills in reading signs of activity within the landscape can greatly benefit the searcher and enhance their observation skills.

Trail signs.

Once the size and shape of footprints is determined, another factor that can aid your search is terrain. Look at the ground. If no footprints are apparent, look for freshly overturned stones (darker on top than the others, maybe even moist looking).

Look for broken twigs and tree branches. They will usually break forward as a person pushes through unless deliberately snapped back to lay a false trail. Fresh breaks will show up as unweathered timber, differently coloured to the rest of the tree. The underside of the leaves will be duller or more brightly coloured as well, depending on the species.

Through thick bush a lightness can be apparent when scrub is pushed aside, much like long grass that is flattened in the direction of travel.

When footprints are found, gauge the weather that has occurred since the person went missing. The amount of dryness of the print can determine an approximate time the person passed that way. Other factors that should be considered are described below:

- If the weather was previously damp and windy, a predominantly dry print will indicate it has been in the open to the wind longer and has had time to dry out.

- If wetter weather had occurred but no real rain has fallen recently, the same print may have been there less long. The heel will be the last area to dry. If the heel is all dry, the person travelled that area a considerable longer time ago than if the print is partially damp.
- If heavy rain has fallen, most prints will appear to wash back into the soil and be little more than a depression. Newer laid prints will be more defined.
- If it is at present drizzling/raining, fresh footprints may disturb the ground surface layer and produce dry sand.

Scuff marks on the ground, which also kicks up rocks, scuff marks on rocks where someone has climbed, broken pieces of rotted wood are all indicators of someone, or something, having travelled that way. A lost person may sit down and rest regularly, so look for heel and seat marks where they may have sat down. Think what you would do in their position and identify likely locations for rest.

Flattened ground beneath trees or amongst the undergrowth can indicate a sleeping place, either of the missing person or fauna. Animal droppings will normally indicate which, through a thorough search of the area might show footprints where a person has used an animal lair. Personal items or human faeces may also be detected in these areas.

Keep an eye out for signals that have been made by the missing person. These include rock piles (sometimes a message may have been left within the layers of rocks), arrows or other marks left on the ground to indicate their direction of travel, flashes from mirrors, or items of clothing.

When tracking, work as a pair if possible. Work to either side of the track rather than directly on top of the person's track. With this method if you lose the trail you can backtrack and pick it up again and resume. If you have trampled all over it, you will have destroyed the clues.

When finding signs treat them the same as when finding search items. Preserve them for analysis and report them.

Like all other search aspects, tracking takes much practice to develop the skill. The eye needs to be thoroughly trained, and then is used in conjunction with a knowledge of the bush.

Sight

- Smoke from campfires (day)
- Light from campfires (night)
- Light from torches (night)
- Footprints
- Clothing
- Pieces of foam sleeping mat
- Trail register
- Disturbed foliage
- Witnesses
- Discardables such as lolly wrappers, drink or food cans, cigarette butts etc.

Appendix R
Task Sheet

Tasking Sheet

Sheet No	
-----------------	--

SAR No.	
Date:	
Location	
Missing Person/s:	
SARMC	

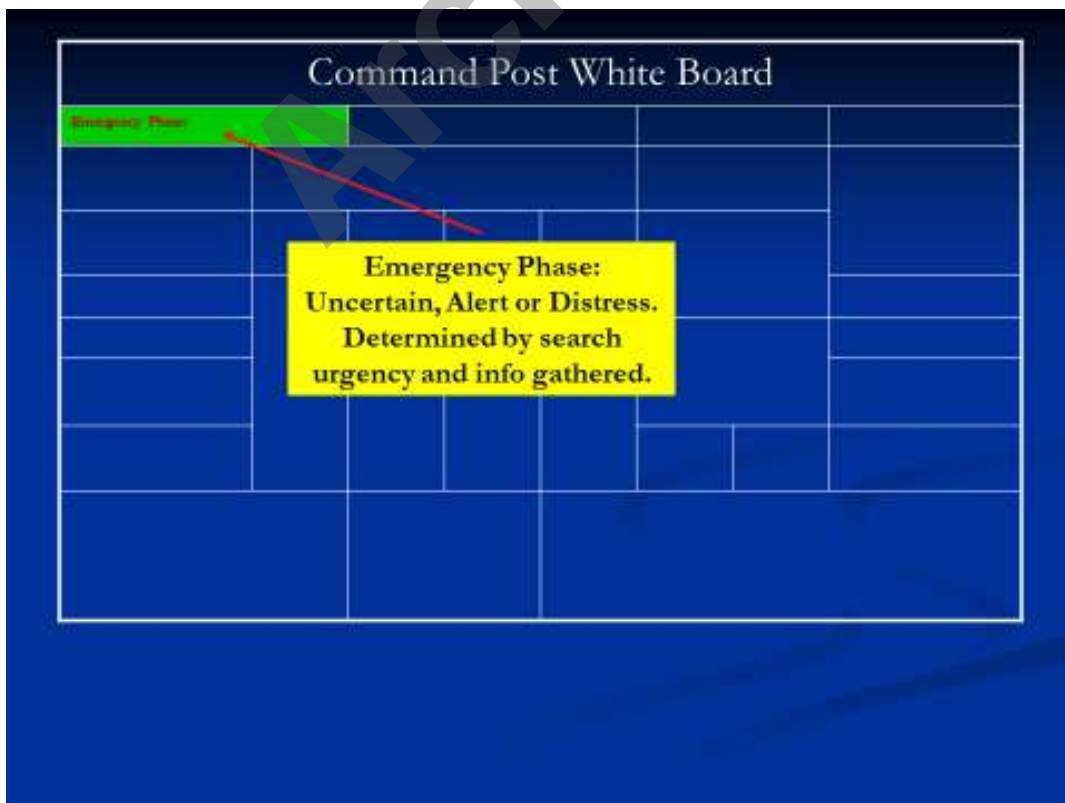
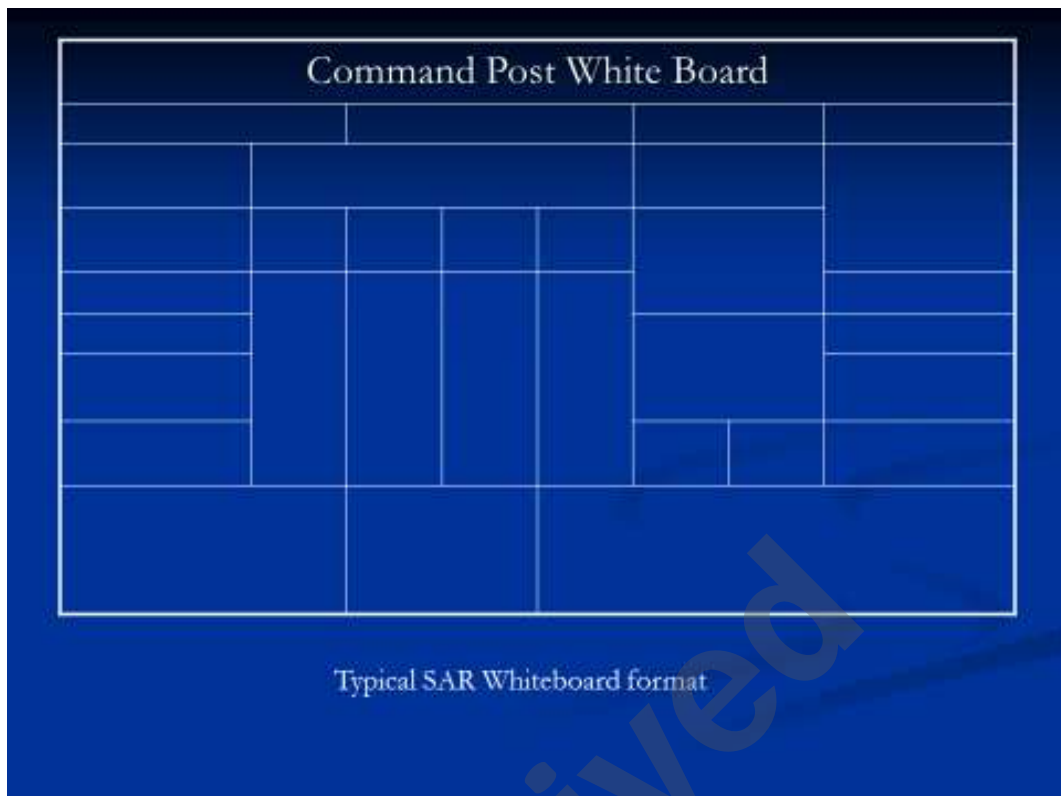
Team		Leader	
		No. in Team	

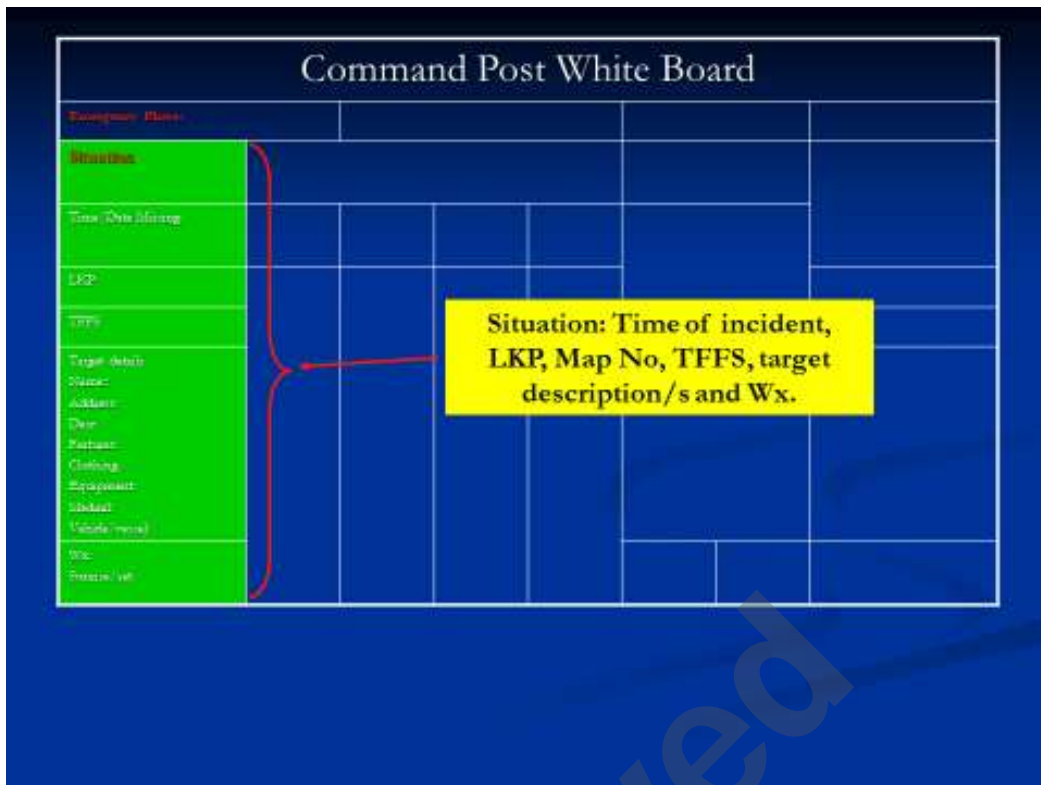
Search Area No.			
Description:			
Map:			
Time out:		Time In:	

Area Searched	Yes/No	If No, what area remains to be searched
POD %		

Signed by Team Leader

Appendix S
Whiteboards





Command Post White Board

Emergency Plans:	Missions: To locate target and return to a place of safety.			
Situations:	Execution Tasking-Search scenarios			
Time/Date Missing:	Asset	Task	Out	In
LKP:	<p>Execution: How are we going to the job? What assets do we have and where are they going to be tasked?</p>			
TFFS:				
Target details:				
Name:				
Address:				
Date:				
Parame:				
Clothing:				
Equipment:				
Medical:				
Vehicle/airal:				
Wx:				
Scenarios/acc:				

Command Post White Board

Emergency Plans:	Missions: To locate target and return to a place of safety.				Administration & Logistics
Situations:	Execution Tasking-Search scenarios				Fuel Water Food
Time/Date Missing:	Asset	Task	Out	In	To Do...
Medical:	<p>Admin & Logistics: What resources do we need to keep the SAR running? Fuel, water, welfare, extra crews etc.</p> <p>A 'To Do' list of this not yet attended to.</p>				Resources
Vehicle/airal:					Number
Wx:					Operations
Scenarios/acc:					Status
					On-site

Command Post White Board

Essentials: Plans		Missions: To locate target and return to a place of safety			Administration & Logistics		Command and Communications	
Situation		Execution Tracking- Search operations			Fuel Water Food		Incident Commander: EMC A/EMC NOC	
Time/Date Missing		Asset	Task	Out	In	To Do:		Radio Channel: Primary Secondary
LCP		<div style="border: 1px solid black; padding: 5px; background-color: yellow;"> Command & Communications: Who is in charge? Who is running the SAR? What radio or other communications systems are you using? Command and media briefings? NOK details </div>			Resources: Numbers: Organizations: Address: Phone:		Contact:	
VPPs							Media Update: Briefing time: Location:	
Target details: Name: Address: DWC: Footwear: Clothing: Equipment: Medical: Vehicle/return							Command Briefing: Briefing time: Location:	
Wc: Status/ret							NOK:	

Command Post White Board

Essentials: Plans		Missions: To locate target and return to a place of safety			Administration & Logistics		Command and Communications	
Situation		Execution Tracking- Search operations			Fuel Water Food		Incident Commander: EMC A/EMC NOC	
Time/Date Missing		Asset	Task	Out	In	To Do:		Radio Channel: Primary Secondary
LCP		<div style="border: 1px solid black; padding: 5px; background-color: yellow;"> Mud Map: Small diagram to show search areas, area of search and reference to HQ. Used as an aid. </div>			Resources: Numbers: Organizations: Address: Phone:		Contact:	
VPPs							Media Update: Briefing time: Location:	
Target details: Name: Address: DWC: Footwear: Clothing: Equipment: Medical: Vehicle/return							Command Briefing: Briefing time: Location:	
Wc: Status/ret							NOK:	
Mud map:								

Command Post White Board

Assignment / Role:		Missions: To locate target and return to a place of safety.			Administration & Logistics:		Command and Communications:	
Situation:		Description: Timing- Search sequence			Fuel: Water: Food:		Incident Commander: SAC: A/SAC: Nac:	
Time/Date Missing		Asset	Task	Out	In	To Do:		Radio Channel: Primary: Secondary:
LCP:						Resources: Numbers: Organizations: Standby: On route:		Contact:
TPTD:								Media Update: Briefing time: Location:
Target details: Name: Address: Date: Footwear: Clothing: Equipment: Medical: Vehicle/animal:								Command Briefing: Briefing time: Location:
Wx: Seasons/season:								NOK:
Map map:		Rescue Plan:						

Rescue Plan: Details how you are going to rescue the target/s. Must be developed in conjunction with search plan.

Command Post White Board

Assignment / Role:		Missions: To locate target and return to a place of safety.			Administration & Logistics:		Command and Communications:	
Situation:		Description: Timing- Search sequence			Fuel: Water: Food:		Incident Commander: SAC: A/SAC: Nac:	
Time/Date Missing		Asset	Task	Out	In	To Do:		Radio Channel: Primary: Secondary:
LCP:						Resources: Numbers: Organizations: Standby: On route:		Contact:
TPTD:								Media Update: Briefing time: Location:
Target details: Name: Address: Date: Footwear: Clothing: Equipment: Medical: Vehicle/animal:								Command Briefing: Briefing time: Location:
Wx: Seasons/season:								NOK:
Map map:		Rescue Plan:		Time line:				

Time lines: Good way to keep track of MP movements, Wx and SAR activities.

Command Post White Board						
Assignment / Plans	Mission: To locate target and return to a place of safety				Administration & Logistics	Command and Communications
Scenario:	Execution Timing: Search sequence				Fuel Water Food	Incident Commander EMC A/EMC NOC
Time/Date Missing:	Asset	Task	Out	In	To Do:	Radio Channel: Primary Secondary
LICP:					Resources: Numbers Organization Standby On-site	Contact:
UPP:						Media Update: Briefing time: Location:
Target details: Name: Address: DOB: Footwear: Clothing: Equipment: Medical: Vehicle/variant:						Command Briefing: Briefing time: Location:
Wc: Suspect/veh:						NOC:
Map map:	Route Plan:				Time log:	

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