

Cases in Quantifying Risk

Ross Cloutier

Thompson Rivers University (adventurestudies.ca)

Bhudak Consultants Ltd. (bhudak.com)

WRMRC



OUTWARD
BOUND



WILDERNESS RISK MANAGEMENT CONFERENCE

www.nols.edu/wrmrc | (800) 710-6657 x3

This document may not be reproduced without the consent of the author 2015

Prelude:

International Organization for Standardizations (ISO)

RISK MANAGEMENT STANDARDS

International Organization for Standardizations (ISO)

- ISO 228 Tourism and Related Services (2014)
 - ISO 21101 (2014) Adventure Tourism – Safety Management Systems
 - ISO 21102 (2013) Adventure Tourism Leaders – Personal Competence
 - ISO 21103 (2014) Information for Participants

[Standards](#)[About us](#)[Standards Development](#)[News](#)[Store](#)[Français](#) | [Русский](#)[Members area](#)[Technical committees](#)[Deliverables](#)[Who develops standards](#)[Why get involved?](#)[Resource area](#)

[Standards Development](#) > [Technical committees](#) > [ISO/TC 228](#)

ISO/TC 228 Tourism and related services

[About](#)[Contact details](#)[Structure](#)[Liaisons](#)[Meetings](#)[Tools](#)

Secretariat: AENOR

Twinned secretariat: INNORPI

Secretary: Mrs. Natalia Ortiz de Zarate

Twinned secretary: Mr. Chokri Makhlouf

Chairperson: Mr Eduardo Moreno Cerezo until end 2017

ISO Central Secretariat contact: Mr Stefan Marinkovic

Creation date: 2005

Scope:

Standardization of the terminology and specifications of the services offered by tourism service providers, including related activities, touristic destinations and the requirements of facilities and equipment used by them, to provide tourism buyers, providers and consumers with criteria for making informed decisions.

Total number of published ISO standards related to the TC and its SCs (number includes updates):	21
Number of published ISO standards under the direct responsibility of ISO/TC 228 (number includes updates):	21
Participating countries:	58
Observing countries:	26

Quick links

[Work programme](#)

(drafts and new work items of ISO/TC 228)

[Business plans](#)[Working area on ISOTC and Public information folder](#)

ISO 21101:2014

Adventure tourism -- Safety management systems -- Requirements

Abstract

[Preview ISO 21101:2014](#)

ISO 21101:2014 outlines the requirements of a safety management system for adventure tourism activity providers.

A provider can use ISO 21101:2014 for the following:

- to enhance safety performance;
- to meet expectations for participant and staff safety;
- to demonstrate safe practice;
- to support compliance with applicable legal requirements.

ISO 21101:2014 can be used by all types and sizes of providers, operating in different geographic, cultural and social environments.

General information Revisions Corrigenda / Amendments

Document published on: 2014-04-01

Edition: 1 (Monolingual) **ICS:** 03.200; 03.080.30

Status: Published **Stage:** 60.60 (2014-04-08)

TC/SC: ISO/TC 228 **Number of Pages:** 22

FORMAT ? LANGUAGE

PDF + PDF + EPUB English

PAPER English

CHF **118** [Add to basket](#)

Keep up to date with ISO
Sign up to our newsletter for the latest news, views and product information

[Subscribe](#)

Got a question?

[Check out our FAQs](#)

[Email customer services](#)

or call us on +41 22 749 08 88
09:00 – 12:30, 14:00 – 17:00 (UTC+1).



ISO Store > Store > Standards catalogue > By TC > ISO/TC 228 Tourism and related services

ISO/TR 21102:2013

Adventure tourism -- Leaders -- Personnel competence

Abstract

[Preview ISO/TR 21102:2013](#)

ISO/TR 21102:2013 indicates what the market normally considers as desirable competencies and the related expected results of competencies for adventure tourism activity leaders common to any adventure tourism activity.

ISO/TR 21102:2013 does not apply to adventure tourism activity leaders involved in underwater activities for which there are other specific International Standards.

General information [Revisions](#) [Corrigenda / Amendments](#)

Document published on: 2013-09-01

Edition: 1 (Monolingual) **ICS:** 03.200; 03.080.30

Status:  Published **Stage:** 60.60 (2013-08-21)

TC/SC: ISO/TC 228 **Number of Pages:** 8

FORMAT ?

LANGUAGE



PDF

EPUB


English



PAPER


English

CHF **58**

 Add to basket

Keep up to date with ISO

Sign up to our newsletter for the latest news, views and product information

 [Subscribe](#)

This document may not be reproduced without the consent of the author 2015



ISO Store > Store > Standards catalogue > By TC > ISO/TC 228 Tourism and related services

ISO 21103:2014

Adventure tourism -- Information for participants

Abstract

[Preview ISO 21103:2014](#)

ISO 21103:2014 specifies minimum requirements for information to be provided to participants before, during and after adventure tourism activities.

ISO 21103:2014 can be used by all types and sizes of providers operating in different geographic, cultural and social environments.

General information Revisions Corrigenda / Amendments

Document published on: 2014-04-01

Edition: 1 (Monolingual) ICS: 03.080.30; 03.200

Status: Published Stage: 60.60 (2014-03-31)

TC/SC: ISO/TC 228 Number of Pages: 6

FORMAT ? LANGUAGE

PDF + EPUB English

PAPER English

CHF 38 [Add to basket](#)

Keep up to date with ISO
Sign up to our newsletter for the latest news, views and product information

[Subscribe](#)

WILDERNESS RISK MANAGEMENT CONFERENCE
OUTWARD
This document may not be reproduced without the consent of the author 2015

International Organization for Standardizations (ISO)

- ISO 31000 Risk Management

[Standards](#)[About us](#)[Standards Development](#)[News](#)[Store](#)[Français](#) | [Русский](#)[Members area](#)[Benefits](#)[Certification](#)[Management system standards](#)[Standards](#) > [ISO 31000 - Risk management](#)

ISO 31000 - Risk management

Risks affecting organizations can have consequences in terms of economic performance and professional reputation, as well as environmental, safety and societal outcomes. Therefore, managing risk effectively helps organizations to perform well in an environment full of uncertainty.

ISO 31000:2009

ISO 31000:2009, *Risk management – Principles and guidelines*, provides principles, framework and a process for managing risk. It can be used by any organization regardless of its size, activity or sector. Using ISO 31000 can help organizations increase the likelihood of achieving objectives, improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment. However, ISO 31000 cannot be used for certification purposes, but does provide guidance for internal or external audit programmes. Organizations using it can compare their risk management practices with an internationally recognised benchmark, providing sound principles for effective management and corporate governance.

Related Standards

A number of other standards also relate to risk management.

- ISO Guide 73:2009, *Risk management - Vocabulary* complements ISO 31000 by providing a collection of terms and definitions relating to the management of risk.
- ISO/IEC 31010:2009, *Risk management – Risk assessment techniques* focuses on risk assessment. Risk assessment helps decision makers understand the risks that could affect the achievement of objectives as well as the adequacy of the controls already in place. ISO/IEC 31010:2009 focuses on risk assessment concepts, processes and the selection of risk assessment techniques.

ISO Store

[IEC 31010:2009](#)[Risk management – Risk assessment techniques](#)[ISO 31000:2009](#)[Risk management – Principles and guidelines](#)[ISO Guide 73:2009](#)[Risk management – Vocabulary](#)

Visit the [ISO Store](#) to buy more standards

Case #1

RATING THE RISK OF INSURING AN OPERATOR

Rating the Risk of Insuring an Operator

The risk of insuring an adventure organization depends on:

- Operating standards (level of professionalism)
- Documentation (joining instructions, plans, procedures, waivers, supporting legislation)
- Loss control program (avoidance, prevention, reduction, segregation, transfer)
- Guide competencies (first aid, training, experience, judgment)
- Administrative procedures (staff training, trip planning, safety talks, joining instructions, response procedures)
- Activity volume analysis (frequency)
- Activity risk analysis (severity)
- Operating terrain analysis (simple, challenging, complex)
- Moral risk (business, owner & guide history)
- Claim history (minor & major claims, close calls)

Scoring Example

	Scoring 1-10	Weight	Total
Operating standards	3	5	15
Documentation content	2	5	10
Loss control program	2	10	20
Guide competencies	2	10	20
Administration procedures	2	5	10
Volume analysis	5	10	50
Activity risk analysis	2	10	20
Operating terrain complexity	2	10	20
Moral risk	2	5	10
Claims history	<u>5</u>	<u>10</u>	<u>50</u>
	27	80	225

Insurance Rating Scale

700-800 - AAA	Exceeds the standard by a wide margin – recommend best rate premium
600-699 - AA	Exceeds the standard – recommend reduced rate premium)
500-599 - A	Meets the standard – recommend base premium
400-499 - B+	Does not meet the standard but is insurable – recommend low premium increase
350-399 - B	Does not meet the standard but is insurable – recommend high premium increase)
300-349 - C	Does not meet the standard but is close. Should not be insured
0 < 299 - D	Does not meet the standard and is not close. Should not be insured)

Case #2

VISITOR SAFETY PLAN SCORING SYSTEM PARKS CANADA



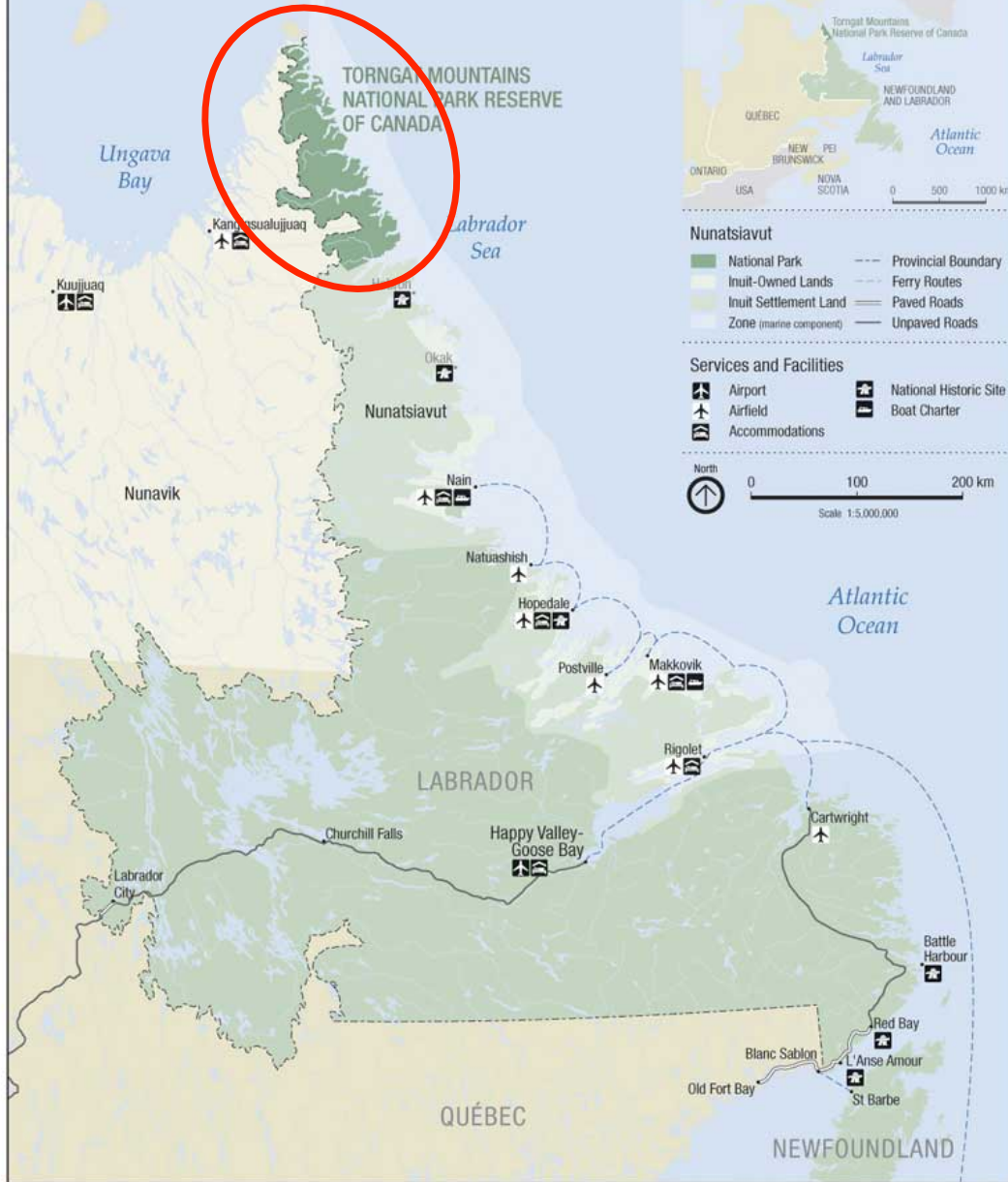
www.nols.edu/wrmmc | (800) 710-6657 x3

WILDERNESS RISK MANAGEMENT CONFERENCE



This document may not be reproduced without the consent of the author 2015

GETTING TO THE
TORNGAT MOUNTAINS
 NATIONAL PARK RESERVE OF CANADA



www.nols.edu/wrrmc | (800) 710-6657 x3

WILDERNESS RISK MANAGEMENT CONFERENCE



This document may not be reproduced
 without the consent of the author 2015

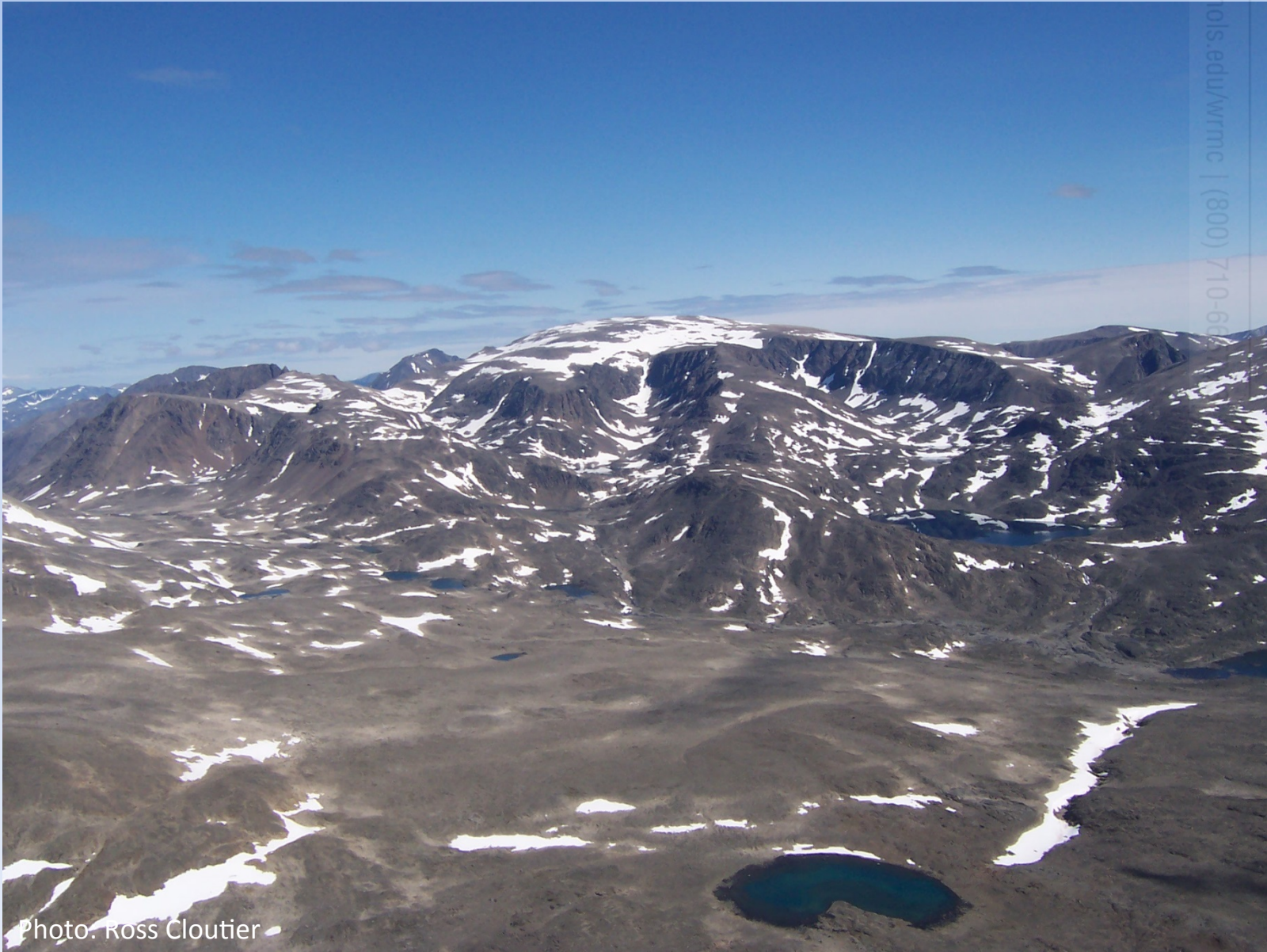


Photo: Ross Cloutier

WRMRC



OUTWARD
BOUND
SCA

WILDERNESS RISK MANAGEMENT CONFERENCE

www.nols.edu/wrmc | (800) 710-6666

This document may not be reproduced
without the consent of the author 2015



Photo: Ross Cloutier

WRMRC



WILDERNESS RISK MANAGEMENT CONFERENCE

WWW.NOLS.EDU | 800.710.6657 X3

This document may not be reproduced
without the consent of the author 2015

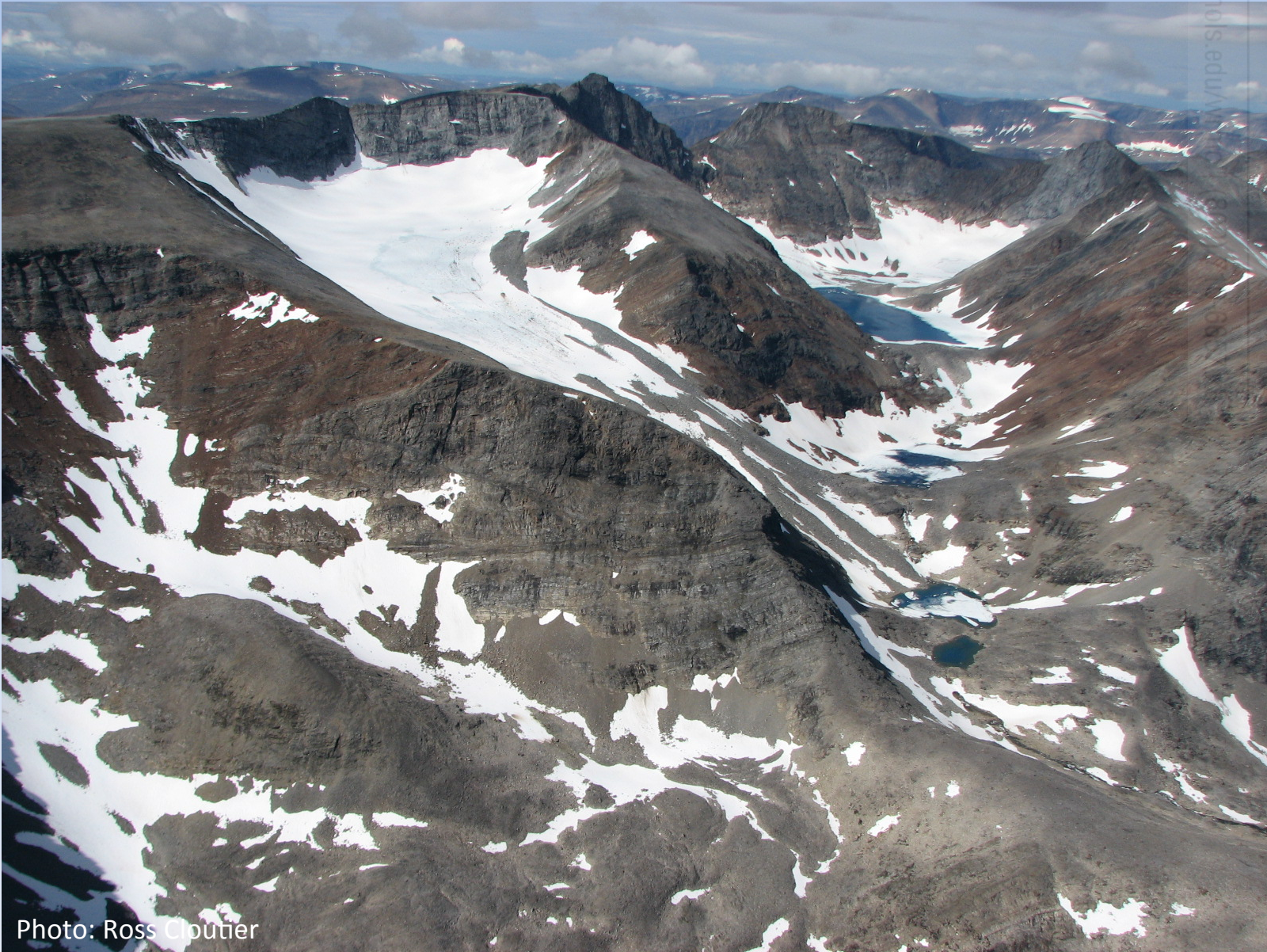


Photo: Ross Cloutier

www.nols.edu/MS

WILDERNESS RISK MANAGEMENT CONFERENCE

WRMRC



OUTWARD
BOUND



This document may not be reproduced
without the consent of the author 2015



Photo: Ross Cloutier

WRMRC



OUTWARD
ROUND



SCA

WILDERNESS RISK MANAGEMENT CONFERENCE

www.nols.edu/wrmrc | (800) 710-0665

This document may not be reproduced
without the consent of the author 2015



Photo: Ross Cloutier

WRMRC



OUTWARD
BOUND
SCA

WILDERNESS RISK MANAGEMENT CONFERENCE

www.nols.edu/wrmc | (800) 710-6657 x3

This document may not be reproduced
without the consent of the author 2015



Photo: Ross Cloutier

WRMRC



NOLS
OUTWARD
BOUND



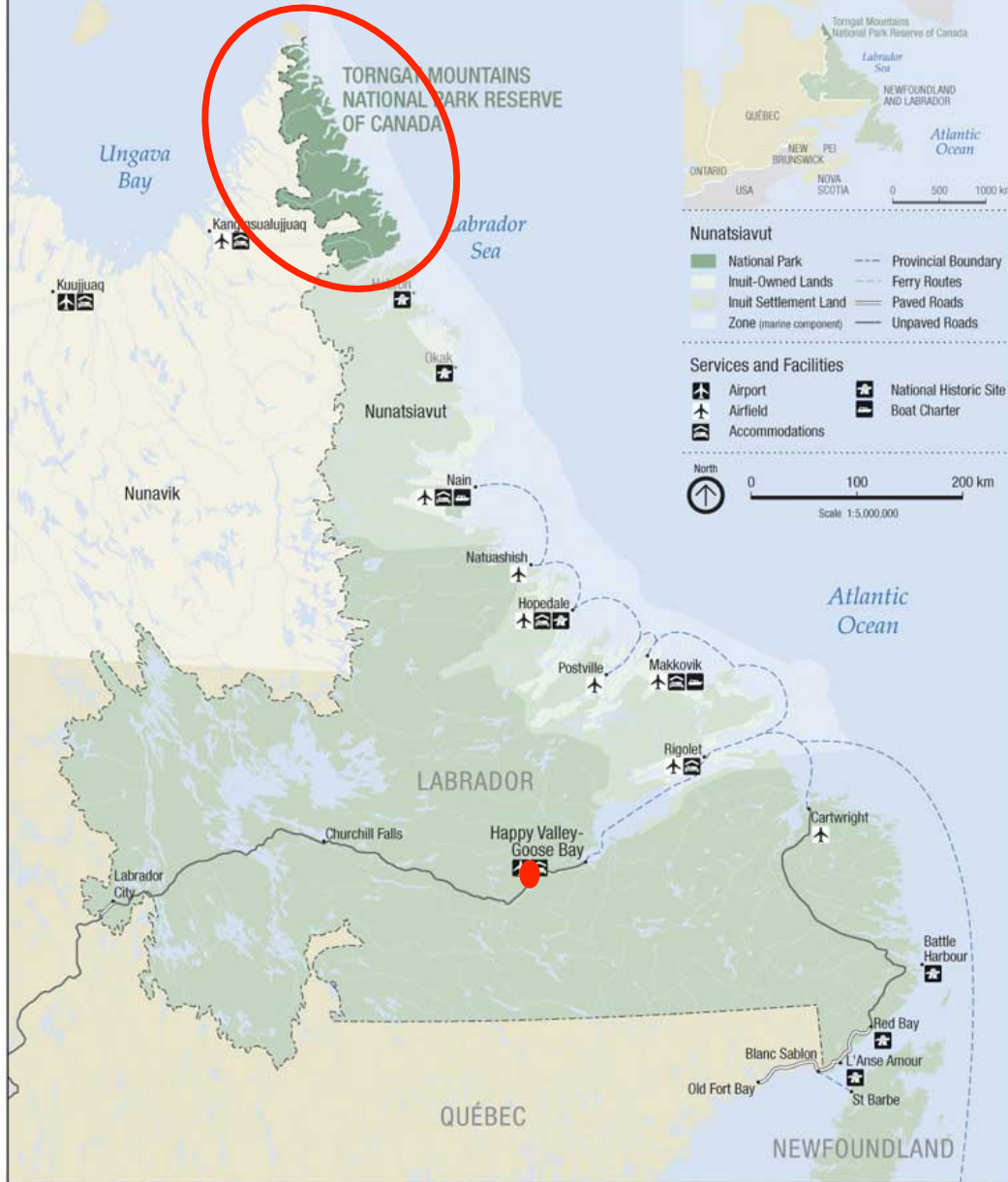
SCA

WILDERNESS RISK MANAGEMENT CONFERENCE

www.nols.edu/wrmrc | (800) 710-6657

This document may not be reproduced
without the consent of the author 2015

GETTING TO THE
TORNGAT MOUNTAINS
 NATIONAL PARK RESERVE OF CANADA



www.nols.edu/wrmmc | (800) 710-6657 x3

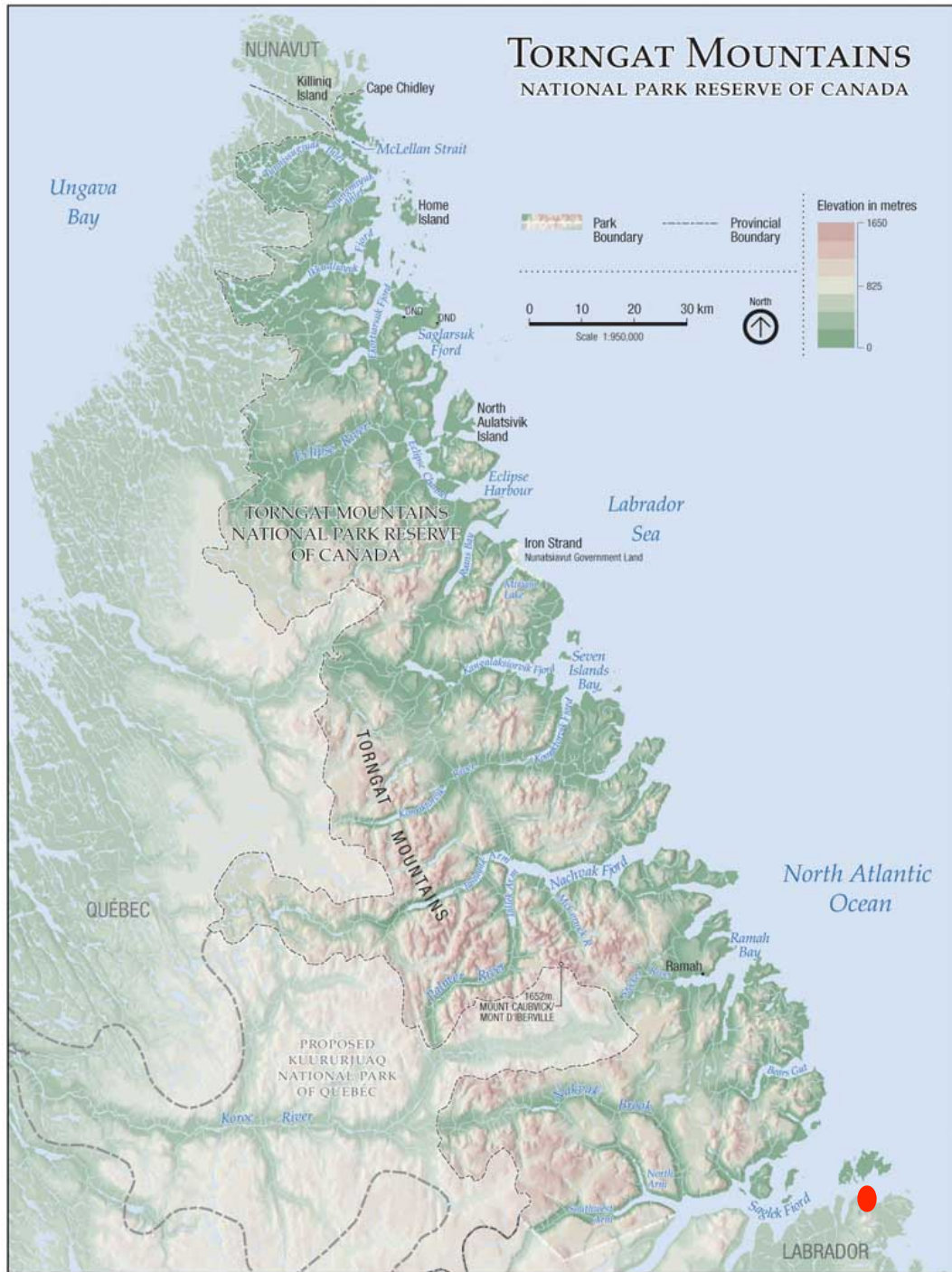
WILDERNESS RISK MANAGEMENT CONFERENCE



This document may not be reproduced without the consent of the author 2015

TORNGAT MOUNTAINS

NATIONAL PARK RESERVE OF CANADA



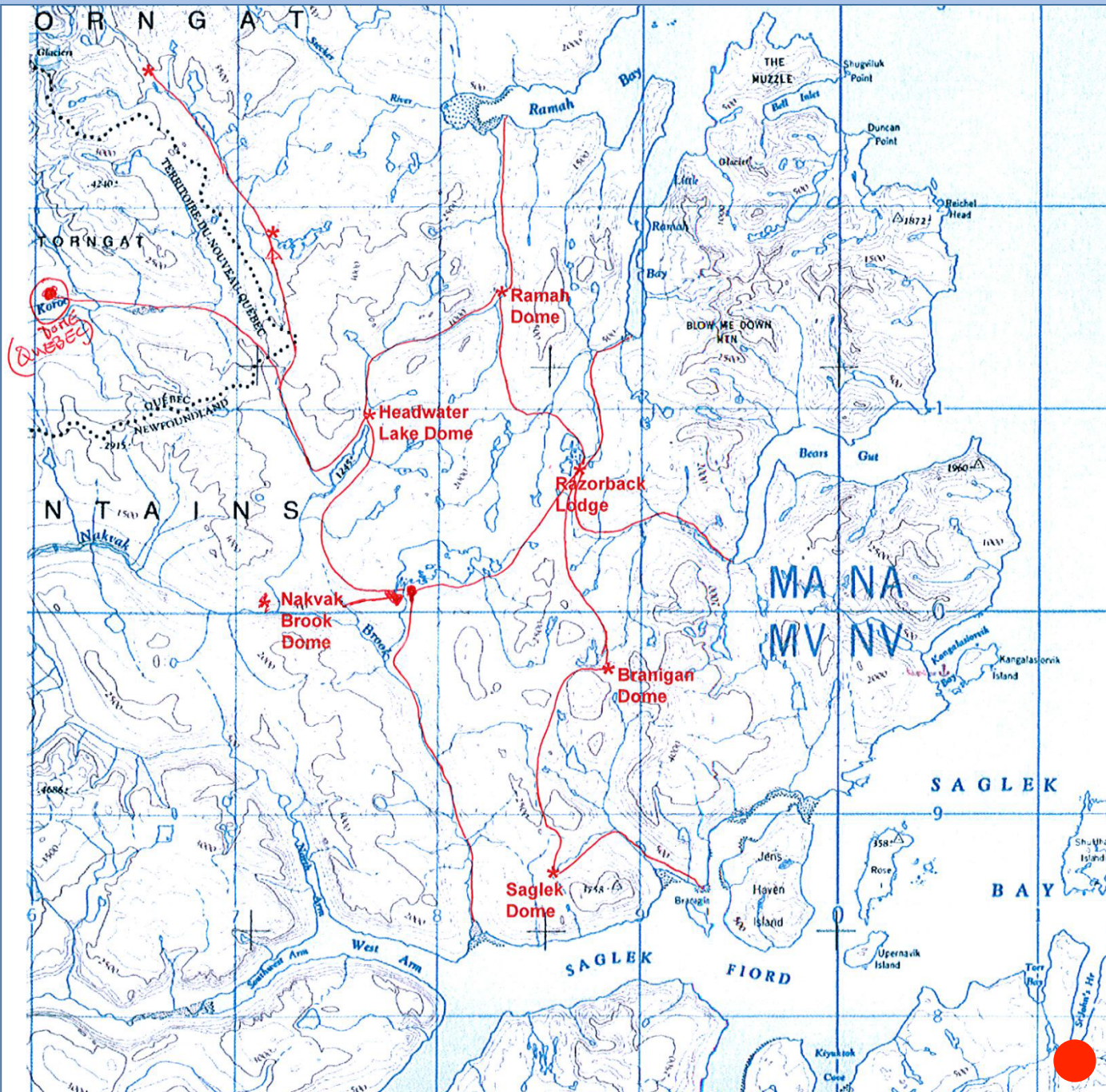
www.nols.edu/wrmc | (800) 710-6657 X3

WILDERNESS RISK MANAGEMENT CONFERENCE

WRMRC



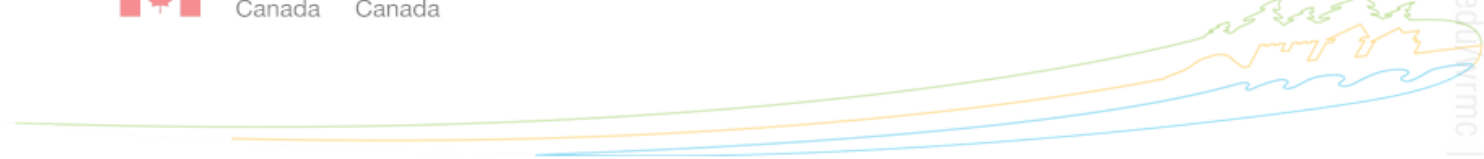
This document may not be reproduced without the consent of the author 2015





Parks
Canada

Parcs
Canada



www.npls.ecdn.wrmc | (800) 710-6657 x3

Visitor Safety Plan

Western Newfoundland and Labrador Field Unit

2014

Heritage places covered by this plan are:

- Torngat Mountains National Park

|

WRMRC



WILDERNESS RISK MANAGEMENT CONFERENCE

This document may not be reproduced
without the consent of the author 2015

Table of Contents

1. CONTEXT FOR VISITOR SAFETY	5
1.1. Introduction.....	5
1.2. Background	5
1.3. Visitor Activity Risk Assessments.....	6
1.4. Scope of the Plan	6
1.5. Purposes of the Plan	7
1.6. Context for Visitor Safety Levels of Services	7
1.7. Framework for Information Flow.....	8
1.8. Responsibilities	9
1.8.1. Field Unit Superintendent	9
1.8.2. Superintendent/Field Unit Resource Conservation Manager.....	9
1.8.3. Asset Manager.....	9
1.8.4. Visitor Experience Manager.....	9
1.8.5. Site Management Team.....	9
1.8.1. Visitor Safety Coordinator	10
1.9. Issue Identification.....	10
1.10. Analysis and Evaluation	11
1.11. Implementation and Monitoring	11
2. TORNGAT MOUNTAINS NATIONAL PARK OVERVIEW	12
2.1. Overview.....	12
2.2. Visitor Numbers	13
2.3. Hazards	13
2.4. Natural Hazards.....	14
2.4.1. Weather	14
2.4.2. Topographical Features.....	14
2.4.3. Water Hazards	15
2.4.4. Sea Ice	15
2.4.5. Rock, Ice and Snow Fall	16
2.4.6. Glaciers.....	16
2.4.7. Wildlife	16
2.5. Infrastructure Hazards	16
2.5.1. Roads	17
2.5.2. Trails	17
2.5.3. Campsites	17
2.5.4. Torngat Mountains Basecamp and Research Station.....	17
2.5.5. Remotely Located Shelters.....	17
2.5.6. Aircraft.....	17
2.5.7. Drinking Water.....	18
2.5.8. Marine Navigational Aids.....	18
2.6. Visitor Characteristic Hazards	18
2.6.1. Experience Level.....	18
2.6.2. Equipment Condition.....	19
2.7. Hot Spots	19

3. LEVEL OF SERVICE FOR VISITOR SAFETY.....	20
3.1. Level of service for preventing visitor safety incidents.....	20
3.1.1. General information:.....	20
3.1.2. Education information:.....	20
3.1.3. Plans, Policies and Procedures.....	21
3.1.4. Communications Infrastructure.....	21
3.1.5. Emergency Caches.....	22
3.2. Level of service for incident response	22
3.2.1. Standard Emergency Response.....	22
3.2.2. Medical Response:.....	25
3.2.3. Search and Rescue response:.....	25
3.3. Justification	25
3.4. External response organizations	26
3.4.1. Ambulance Service.....	26
3.4.2. Police.....	27
3.4.3. Ground Search and Rescue.....	27
3.4.4. Air Search and Rescue Service.....	27
3.4.5. Marine Search and Rescue Services.....	28
3.4.6. Parc national Kuururjuaq	28
3.4.7. <i>Nunatsiavut Group of Companies (NGC)</i>	28
3.5. Internal response capabilities	29
3.5.1. Parks Canada SAR team.....	29
3.5.2. Chartered Helicopter	29
4. ACTIVITY RISK ASSESSMENT SUMMARY.....	29
4.1. Control Analysis & Priority Setting.....	30
4.1.1. Table 1 – Summary of Risk & Control Scores.....	31
Table 2 – Activity Risk Ranking.....	32
Table 3 – Control Action Plan for Priority Issues.....	33
5. APPENDICES.....	37
5.1. Appendix 1 – Comparative Assessment Level of Service.....	37
5.2. Appendix 2 – Visitor Activity Risk Assessments.....	39
1.1.1 Backpacking.....	41
1.1.2 Boat Tours – Day Trips and Multi-day Tours	48
1.1.3 Camping – Backcountry	55
1.1.4 Camping – Serviced at Base Camp & Research Station	61
1.1.5 Canoeing/Kayaking – Coastal/Ocean.....	66
1.1.6 Climbing – Mountaineering/Scrambling	72
1.1.7 Cruise Ship Passenger Shore Visits	77
1.1.8 Helicopter Transportation	81
1.1.9 Hiking/Walking	87
1.1.10 Nature Viewing – Bird Watching, Sightseeing, Wildlife Obs, Photography, Historic Site Visits	92
1.1.11 Sail Cruising.....	97
1.1.12 Snowmobiling.....	101
5.3. Service Level Operating Guidelines.....	105
5.4. Emergency Response Protocols.....	117

5.2. Appendix 2 – Visitor Activity Risk Assessments

Visitor Safety: Visitor Activity Risk Assessment Templates

Backpacking Risk Assessment

HAZARDS	Risk Rating		RISK CONTROL MEASURES	Control Rating					
	Consequence (1-5)	Likelihood (1-5)		Adequate (1,2,3)	Documented (1,3,6)	Applied (1,2,3)	Control Score (A+D+A)		
List the hazards that could cause injury when the activity is performed.			<ul style="list-style-type: none"> Education/Information includes all communications associated with websites, signs, publications, media and staff contact through verbal communications and physical presences of staff. Infrastructure includes all permanent and temporary means to alter the environment. Plans, Policies & Procedures includes all Guidelines, SOP's, SWP's, Directions, Inductions, Training Manuals, Local Procedures and Systems that are relevant Incident Response includes all reactive and proactive response actions to hazards or incidents. 						
Water contamination /parasites	1	3	3	<ul style="list-style-type: none"> Education/Information 	<ul style="list-style-type: none"> Pre-visit information on website, in Registration, Safety Rules and Regulations pre-trip package, and in brochures Staff awareness of water quality issues Staff verbal communication 	1	1	1	3
				<ul style="list-style-type: none"> Infrastructure 	<ul style="list-style-type: none"> Provide safe drinking water at the Base Camp & Research Station Encourage water filtration in the backcountry 	1	1	1	3
				<ul style="list-style-type: none"> Plans/Policy/Procedure 	<ul style="list-style-type: none"> Apply the Safe Drinking Water Guidelines and testing procedures 	1	1	1	3
				<ul style="list-style-type: none"> Incident Response 	<ul style="list-style-type: none"> Emergency Contact Protocols Evacuation or external SAR resource as required 	1	1	1	3

Rough and Dangerous Trail Conditions/ Trips and Falls	3	4	12	<ul style="list-style-type: none"> • Education/Information 	<ul style="list-style-type: none"> • Pre-visit information on hiking route status on website and in pre-visit information packages • Route brochures and maps • Information on type of trail conditions underfoot (loose talus and boulders) • Warnings in Waiver and Assumption of Risk document • Staff awareness of route conditions • Staff verbal communications 	1	1	1	3
				<ul style="list-style-type: none"> • Infrastructure 	<ul style="list-style-type: none"> • Trail closures, maintenance plans, classification system implemented 	1	1	1	3
				<ul style="list-style-type: none"> • Plans/Policy/Procedure 	<ul style="list-style-type: none"> • Trail inspection regimes • Trails and Back Country facility design guidelines • Site Management Plan, • Visitor safety Plan • Emergency Contact Protocols 	1	1	1	3
				<ul style="list-style-type: none"> • Incident Response 	<ul style="list-style-type: none"> • Trained staff appropriate to likelihood • Appropriately maintained equipment • Evacuation or external SAR resource as required 	1	1	1	3

Parks Canada Torngat Mountains National Park Visitor Safety Plan (2014)

Wildlife Encounters (Black & Polar Bears)	5	5	25	<ul style="list-style-type: none"> • Education/Information 	<ul style="list-style-type: none"> • Pre-visit information on website, in Registration, Safety Rules and Regulations pre-trip package, and in brochures • Visitor-bear interaction educational materials • Warnings in Waiver and Assumption of Risk document • Strongly encouraging groups to hire a bear monitor • Staff prevention guideline implementation, wildlife awareness training • Staff verbal communication 	1	1	1	3
				<ul style="list-style-type: none"> • Infrastructure 	<ul style="list-style-type: none"> • Provide appropriate wildlife proof food and waste storage at the Base Camp and Research Station. • Electric fences around the Base Camp and Research Station • Electric fences strongly encouraged for all backcountry campsites • Requirement to carry bear deterrents • Firearm carried by bear monitors 	3	1	1	5
				<ul style="list-style-type: none"> • Plans/Policy/Procedure 	<ul style="list-style-type: none"> • Wildlife/Human Conflict Plan, Site Management Plan, Safe Work Practices, Visitor Safety Plan, Standard Operating Procedures, Firearm Policy 	1	1	1	3
				<ul style="list-style-type: none"> • Incident Response 	<ul style="list-style-type: none"> • Emergency Contact Protocols • Evacuation or external SAR resources as required 	1	1	1	3

WILDERNESS RISK MANAGEMENT CONFERENCE
 www.nols.org
 (900) 710-6657 x1
 Without the consent of the author 2015
 This document may not be reproduced

1.1.1 Backpacking

Action Plan – Red & Yellow Flag Issues

Priority Issue	Risk & Control Scores		Control Action Category (Education/Information, Infrastructure, Plans/Policy/Procedure, Incident Response)	Proposed Treatment/Action	Responsibility	Priority/Timing	Control Score Post-Treatment			
	Risk Score	Control Score					Adequate	Documented	Applied	Total Score
Red Flag										
Bear contact	25	5	Infrastructure	<ul style="list-style-type: none"> • Portable electric fences and deterrents will not prevent all bear incidents • Groups without accompanying Inuit bear monitors will remain at high risk • Consideration should be given to permanently fenced campsites for campers • Consideration should be given to permanent buildings/huts for campers 						
Yellow Flag										
Trail conditions	12	3	Education & Response	<ul style="list-style-type: none"> • Rough walking conditions and boulders will cause ankle, knee and leg injuries • Education and warnings about walking conditions and evacuation capability must be available 						

Table of Contents

1.1.1	Backpacking	41
1.1.2	Boat Tours – Day Trips and Multi-day Tours	48
1.1.3	Camping – Backcountry	55
1.1.4	Camping – Serviced at Base Camp & Research Station	61
1.1.5	Canoeing/Kayaking – Coastal/Ocean	66
1.1.6	Climbing – Mountaineering/Scrambling	72
1.1.7	Cruise Ship Passenger Shore Visits	77
1.1.8	Helicopter Transportation	81
1.1.9	Hiking/Walking	87
1.1.10	Nature Viewing – Bird Watching, Sightseeing, Wildlife Observation, Photography, Historic Site Visits	92
1.1.11	Sail Cruising	97
1.1.12	Snowmobiling	101

4.1.1. Table 1 – Summary of Risk & Control Scores

Activity (populate this column with all allowable activities in the management area – refer to VARAs)	Average Risk Score (Top 3 only) (1)	Average Control Score (2)	Combined Average Risk Score (1 + 2)	Highest Risk Score (3)	Highest Control Score (4)	Combined Highest Risk Score (3+4)	
	Note: Highest 3 risk scores divided by 3	Note: Highest 3 control scores divided by 3					
Backpacking – Multi-day	45/3=15	11/3=3.66	18.66	25	5	30	
Boat Tour – Day Trips & Multi-day trips	20/3=6.66	27/3=9	15.66	12	9	21	
Camping – Backcountry	45/3=15	11/3=3.66	18.66	25	5	30	
Camping - Serviced at Base Camp	23/3=7.66	9/3=3	10.66	9	3	12	
Canoeing/Kayaking – Coastal/Ocean	45/3=15	17/3=5.66	20.66	25	9	34	
Climbing – Mountaineering/Scrambling	24/3=8	13/3=4.33	12.33	9	7	16	
Cruise Ship Passenger Shore Visits	17/3=5.66	9/3=3	8.66	9	3	12	
Helicopter Transportation	30/3=10	9/3=3	13	12	6	18	
Hiking/Walking – Day trips near Base Camp	45/3=15	9/3=3	18	25	3	28	
Nature Viewing – Bird Watching, Sightseeing, Wildlife Observation, Photography, Historic Site Visitation	25/3 = 8.33	9/3=3	11.33	12	3	15	
Sail Cruising	17/3=5.66	9/3=3	8.66	8	3	11	
Snowmobiling	18/3=6	9/3=3	9	6	3	9	
Level of Risk Code	Very High 21-25	High 13-20	Moderate - Low 1-12	Level of Control Code	Poor 10-12	Fair 7-9	Excellent - Good 3-6

Table 2 – Activity Risk Ranking ranks the sites activities in order of risk exposure. As actions are completed or situations change, activities average score will change, moving that activity either up or down in the ranking table. Some activities that are more “risky” will be high on the list but have no Red or Yellow flags requiring action. These activities require monitoring and should be reviewed in the case of a significant incident to ensure controls are still adequate and effective.

Table 2 – Activity Risk Ranking (populate as per risk assessment results and Table 1 data)

Activity Risk Ranking	Activity (Arrange activities in order highest to lowest based on combined average score. If scores are equal, continue to sort by combined highest score and percentage participation) Delete activities not applicable to the management area)	Combined Average Risk Score	Combined Highest Risk Score	Percentage of Activity Participation	Red or Yellow Actions Identified (Y or N)
1	Canoeing/Kayaking – Coastal-Ocean	20.66	34	<1%	Y
2	Backpacking – Multi-day	18.66	30	10%	Y
3	Camping – Backcountry	18.66	30	10%	Y
4	Hiking/Walking – Day Trips near Base Camp	18	28	90%	Y
5	Boat Tour – Day Trips & Multi-Day	15.66	21	90%	Y
6	Helicopter Transportation	13	18	80%	Y
7	Climbing – Mountaineering/Scrambling	12.33	16	<1%	Y
8	Nature Viewing	11.33	15	100%	Y
9	Camping – Serviced at Base Camp	10.66	12	90%	Y
10	Cruise Ship Passenger Shore Visits	8.66	12	40%	Y
11	Sail Cruising	8.66	11	<1%	Y
12	Snowmobiling	8.66	9	<1%	Y

Table 3 – Control Action Plan for Priority Issues summarises all identified Red and Yellow risk controls, its priority and timeframe. This Table now provides a summary of the hazards and issues that have a fair or poor level of control. This table is to be used for work planning, budgeting and program development. Further details can be found in the individual activity risk assessment.

Table 3 – Control Action Plan for Priority Issues

Activity	Hazard or Issue	Control Action Category	Current Risk Score	Current Control Score	Proposed Priority Actions	Projected Risk Score	Projected Control Score	Responsibility	Timeframe	Priority
Canoeing/Kayaking – Coastal/Ocean	Bear Contact	Education & Policy	25	9	<ul style="list-style-type: none"> • Need to develop policy & procedures regarding the activity of multi-day coastal paddling trips • Strong information packages, assumption of risk, and legal releases are required 					
Backpacking & Camping	Bear Contact	Infrastructure	25	5	<ul style="list-style-type: none"> • Strongly encourage groups to hire Inuit bear monitors • Consideration should be given to permanently fenced campsites for campers • Consideration should be given to permanent buildings/huts for campers 					
Hiking/Walking	Bear Contact	Education, Infrastructure & Procedure	25	3	<ul style="list-style-type: none"> • Individuals and groups should be accompanied by Inuit bear 					

Case #3

SAR TEAM RISK ASSESSMENT (RADEMS TOOL)



Government
of Canada

Gouvernement
du Canada

National Search
and Rescue
Secretariat

Secrétariat national
Recherche et
sauvetage



Emergency
Management BC

www.nols.edu/wm-c | (800) 710-6657 x3

WILDERNESS RISK MANAGEMENT CONFERENCE



GROUND SAR RESPONSE ASSESSMENT AND DECISION MAKING (RADEMS)

This document may not be reproduced
without the consent of the author 2015

ALTERNATIVE RISK ASSESSMENT TOOL FORMATS

HEAT MAPS/MATRICES

Impact	Risk Management Actions		
Significant	Considerable management required	Must manage and monitor risks	Extensive management essential
Moderate	Risks may be worth accepting with monitoring	Management effort worthwhile	Management effort required
Minor	Accept risks	Accept, but monitor risks	Manage and monitor risks
	Low	Medium	High
	Likelihood		

AVANATOUR TRIP PLANNER v2.0

Remember to verify all information used during the trip planning stage at the trail head. Confirm that the trip decision is still within the comfort zone and skill level of your group.

DANGER RATING
Refer to public bulletins for danger ratings at www.avalanche.ca

EXTREME	NOT RECOMMENDED	
HIGH	EXTRA CAUTION	
CONSIDERABLE	CAUTION	
MODERATE		
LOW		

SIMPLE CHALLENGING COMPLEX

AVALANCHE TERRAIN RATING
Terrain definitions available at www.avalanche.ca
*Use elevation specific danger rating. **Use highest danger rating

CHECK LISTS

Hazard Risk Assessment Quick Card

Date:	South Columbia SAR	Location:	
Time:		Explanation of task or training:	
Team Leader/Instructor:			
Members present:			

Hazard:

Circle a Risk factor
Very Low Low Medium High

Very High

What measures have been taken to control risks:

Continue Task/ Training Stop and Think

Control Measures Identify the Hazards

Assess the Risks

Notes:

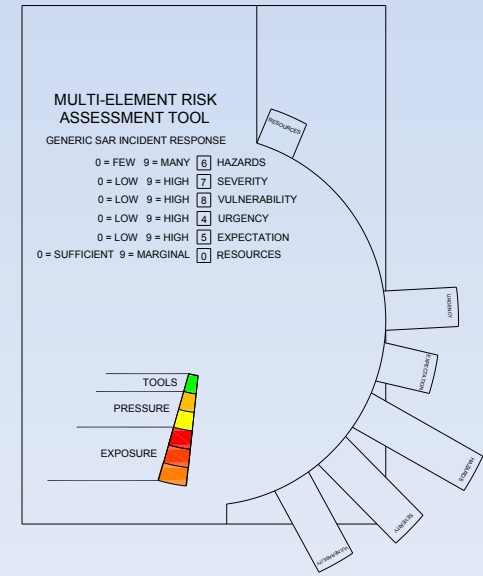
Completed by:

DYNAMIC TOOLS

SURVIVABILITY

ENVIRONMENT

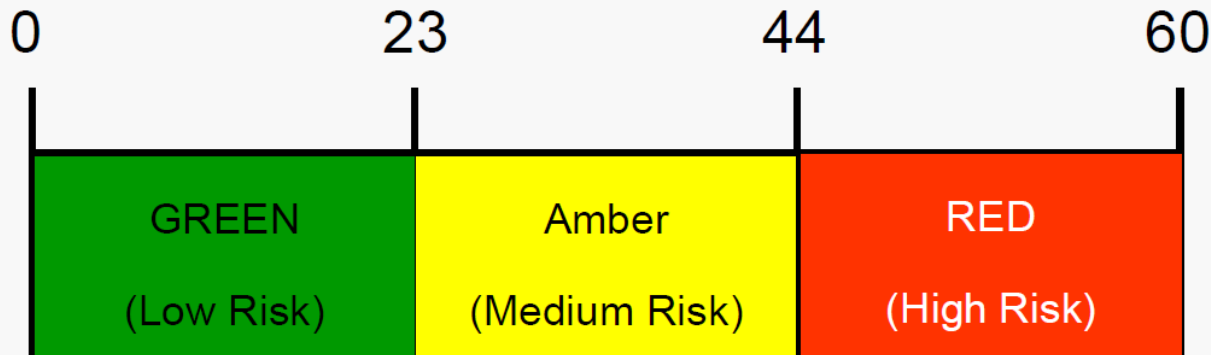
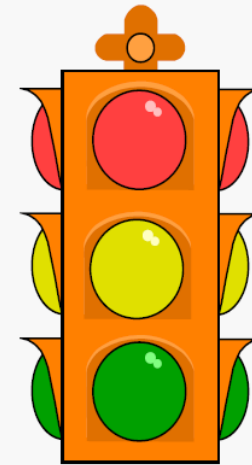
RESOURCES



ALTERNATIVE RISK ASSESSMENT TOOL FORMATS

US Coast Guard GAR Model – Capt. Scott LaRochelle

- Another model used for SAR risk assessment is the GAR Model (Green, Amber, Red)
- Six elements:
 - Supervision 0-10
 - Planning 0-10
 - Crew selection 0-10
 - Crew fitness 0-10
 - Environment 0-10
 - Event complexity 0-10
- Assign a score 0-10 for each element



ALTERNATIVE RISK ASSESSMENT TOOL FORMATS

AIR FORCE EXAMPLE – COMBINATION HEAT MAP/FORM

TF Pegasus High-Risk Decision Matrix

DTG: 231630Z0CT07

TF: TF Talon

CG GO

CG NO-GO

MISSION: 3xUSMil, 2xUrg, 1xUrg-S 1xGSW-Arm, 2xGSW-Abd

REMARKS: _____

A/C PACKAGE 1 1 1 1

MSN NECESSITY	X			TROOPS IN DNGR	ENEMY TGT	NOT TIME SENSITIVE	
MEDICAL NECESSITY	X			URGENT	PRIORITY	ROUTINE	
WX (D) CEILING & VIS				>700/2	>500/1	<500/1	
WX (N) CEILING & VIS		X		>1,000/3	>700/2	<700/2	PRED: 2,000-3 WORST: 1,000-2
ILLUM & ANGLE			X	>79%, >30	40-78%, <30	39-25%, >Hor	ILLUM: 18% MOON ANGLE: 10%
ENEMY THREAT		X		LOW	MODERATE	HIGH	
CREW RISK VALUE	X			LOW	MODERATE	HIGH	EXTRA HIGH
MSN PLANNING TIME	X			OPTIMUM = >6 Hrs.	ADEQUATE = 3-6 Hrs.	MINIMUM < 3 Hrs.	JAF-BLE-ABAD-JAF
FLIGHT ROUTE	X			GOOD	MARGINAL	DIFFICULT	
EOF (AH, HH)	X			GOOD	MARGINAL	POOR	

OTHER CONSIDERATIONS Crews >100 hrs. in area
(e.g., Single-ship Opns, No AH escort, UH >8,500 feet, CH>10,000 feet, etc.)

BN CDR RECOMMENDATION: Recommend Approval

P6 RECOMMENDATION: Recommend Approval, WX no less than 1 statute mile

MATRIX DEVELOPMENT

GENERIC 'IMPACT VS LIKELIHOOD' MATRIX (HEAT MAP)

EXAMPLE FROM MISSION SAR



CONSEQUENCES	PROBABILITY OF OCCURRENCE			
	VERY UNLIKELY	UNLIKELY	LIKELY	VERY LIKELY
FATAL	HIGH RISK	VERY HIGH RISK	VERY HIGH RISK	VERY HIGH RISK
SERIOUS	MEDIUM RISK	HIGH RISK	VERY HIGH RISK	VERY HIGH RISK
MODERATE	LOW RISK	MEDIUM RISK	HIGH RISK	VERY HIGH RISK
MINOR	VERY LOW RISK	LOW RISK	MEDIUM RISK	HIGH RISK

UNACCEPTABLE RISK

AVALUATOR™ TRIP PLANNER v2.0

Remember to verify all information used during the trip planning stage at the trail head. Confirm that the trip decision is still within the comfort zone and skill level of your group.

DANGER RATING
Refer to public bulletins for danger ratings at www.avalanche.ca



AVALANCHE TERRAIN RATING
Terrain definitions available at www.avalanche.ca
*Use elevation specific danger rating **Use highest danger rating

canadianavalanchecentre
Anomalies in terrain and avalanche conditions may exist. Users of the AVALUATOR™ assume their own risk. © 2010 Canadian Avalanche Centre

AVALUATOR™ SLOPE EVALUATION v2.0

AVALANCHE CONDITIONS

Regional Danger Rating: Is the avalanche danger rating "Considerable" or higher?	+1
Persistent Avalanche Problem: Is there a persistent or deep persistent slab problem in the snowpack?	+1
Slab Avalanches: Are there signs of slab avalanches in the area from today or yesterday?	+1
Signs of Instability: Are there signs of snowpack instability including <i>whumpfs</i> , shooting cracks or drum-like sounds?	+1
Recent Loading: Has there been loading within the past 48 hours including roughly 30 cm of new snow or more, significant wind transport or rain?	+1
Critical Warming: Has there been a recent rapid rise in temperature to near 0 C, or is the upper snowpack wet due to strong sun, above-freezing air temperatures or rain?	+1
Avalanche Conditions Score:	<input type="checkbox"/>

TERRAIN CHARACTERISTICS

Slope Steepness: Is the slope steepness between 30 and 35 degrees?	+1
Or Is the slope steeper than 35 degrees?	+2
Terrain Traps: Are there gullies, trees or cliffs that increase the consequences of being caught in an avalanche?	+1
Slope Shape: Is the slope convex or unsupported?	+1
Forest Density: Is the slope in the alpine, in a sparsely treed area or in open forest (cut-block, burn, wide-spaced glades)?	+1
Terrain Characteristics Score:	<input type="checkbox"/>

Visit www.avalanche.ca for more information.

canadianavalanchecentre

Anomalies in terrain and avalanche conditions may exist. Users of the AVALUATOR™ assume their own risk. © 2010 Canadian Avalanche Centre

www.nols.edu/wrmmc | (800) 710-6655
WILDERNESS RISK MANAGEMENT CONFERENCE
WRMRC | NOLS OUTWARD BOUND

This document may not be reproduced without the consent of the author 2015

ASSESSING SAR OPERATIONAL RISK

(from Colorado Mountain Rescue)

- **Activity:** (defined by catastrophic potential as some activities are more dangerous than others) helicopter long-line, swiftwater, rope rescue, mountain rescue, avalanche rescue or a search
- **Personnel physical elements (skills, knowledge & experience):** physical conditioning, physical skills, rescue techniques, emergency medical providers, experience in the environment, food & water, sleep
- **Personnel mental elements:** hazard recognition, situational awareness, adaptability and flexibility, deviations from established plans, judgment and leadership, teamwork, knowledge of resources available
- **Personnel emotional elements:** ego, who comes first, “Go fever,” subjects emotional and psychological state, inter-team dynamics, leader control and authority
- **External influences:** public and official pressure, subject friends and family, media, other outside influences
- **Survivability:** who it is that is being rescued, what the medical necessity is
- **Equipment:** its appropriateness, its quality/quantity, maintenance, knowledge of how to use it
- **Planning:** time available, completeness, quality of information available, unknowns

Assessing SAR Operational Risks

DEVELOPMENT OF 'X' AND 'Y' AXIS COMPONENTS (ELEMENTS)

1. SAR Operation Risk

Risks associated with:

Complexity

Activity Hazards

Environmental Conditions

Vulnerability

(team exposure)

External Influences

2. Team Capability

Risks associated with lack of:

Personnel Training

Personnel Experience

Personnel Preparedness

(mental and physical)

Planning

Resources

SAR Operation Risk Score

<p>SAR Operational Complexity How complex & complicated is the task?</p> <p>LOW MODERATE HIGH</p> <p>0 1 2</p>	
<p>Activity Hazards How high are the hazards in the activities?</p> <p>LOW MODERATE HIGH</p> <p>0 1 2</p>	
<p>Environmental Conditions How high are the environmental hazards?</p> <p>LOW MODERATE HIGH</p> <p>0 1 2</p>	
<p>Vulnerability How exposed and vulnerable are the team members?</p> <p>LOW MODERATE HIGH</p> <p>0 1 2</p>	
<p>External Influence What is the level of pressure due to survivability, media, family and/or other?</p> <p>LOW MODERATE HIGH</p> <p>0 1 2</p>	
Total Score:	

Response Capability Score

<p>Personnel Training What level of training do personnel have?</p> <p>HIGH MODERATE LOW</p> <p>0 1 2</p>	
<p>Personnel Experience What level of experience do personnel have?</p> <p>HIGH MODERATE LOW</p> <p>0 1 2</p>	
<p>Personnel Mental & Physical Preparedness How mentally & physically prepared are personnel?</p> <p>HIGH MODERATE LOW</p> <p>0 1 2</p>	
<p>Planning How much planning has there been?</p> <p>HIGH MODERATE LOW</p> <p>0 1 2</p>	
<p>Resources What is the level of resources available?</p> <p>HIGH MODERATE LOW</p> <p>0 1 2</p>	
Total Score:	

See rating guide for more thorough interpretation of scores on specific SAR scenarios.

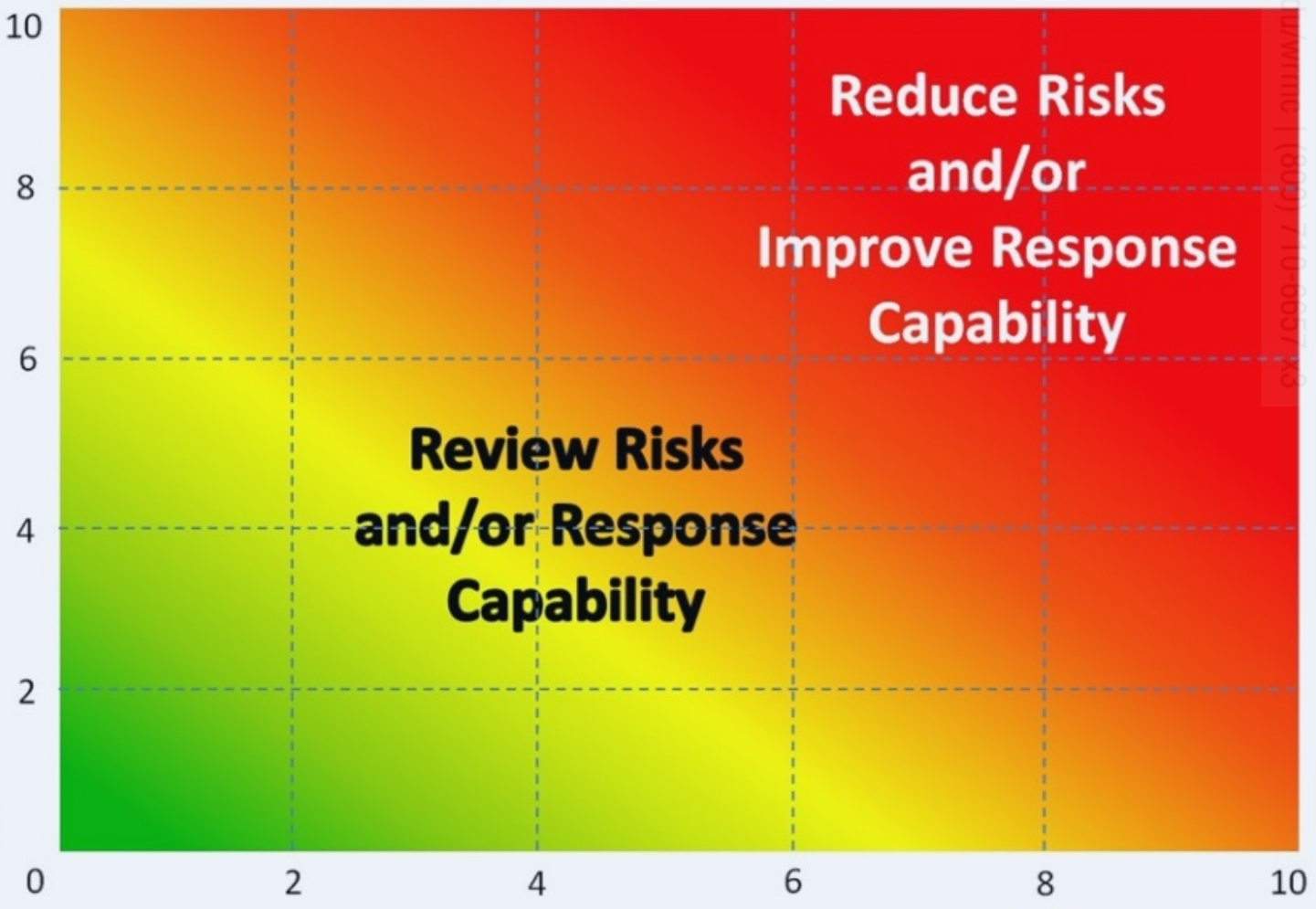
WILSON/STANFORD/IRMC | (800) 710-6657 X3
 WILSON'S RISK MANAGEMENT CONFERENCE
 LOS ANGELES, CA

This document may not be reproduced without the consent of the author © 2015



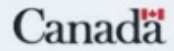
SAR RESPONSE ASSESSMENT AND DECISION MAKING GUIDE

SAR OPERATION RISK SCORE



Government of Canada
 National Search and Rescue Coordinator

Government of British Columbia
 Search and Rescue



RESPONSE CAPABILITY SCORE



Emergency Management BC

WWW.BCSARA.CA
 (604) 710-6657

WILDERNESS RISK MANAGEMENT CONFERENCE

This document may not be reproduced without the consent of the author 2015

RATING GUIDES

OPERATION RISK SCORE – GROUND SEARCH

		1a SAR OPERATION RISK SCORE	RATING GUIDE – GROUND SEARCH
Operational Complexity	0	LOW	Simple operation, requiring one or two single activities (e.g. Locate and escort to safety). 1-8 hour duration. Minor subject injuries.
	1	MODERATE	More complex operation, requiring multiple activities (e.g. Locate and evacuate using a litter) with some challenges both in access and egress. 8-24 hour duration. Significant non-life-threatening injuries
	2	HIGH	Very complex operation involving multiple teams. Convergent volunteers. Difficult access and egress. Helicopter transport. Multi-day or multi-organization response. Life-threatening injuries.
Activity Hazards	0	LOW	Simple basic GSAR activities; orienteering, tracking and/or sweep searching. Simple terrain. Hazards are low probability and low severity.
	1	MODERATE	Potential for several disciplines required to access and evacuate the subject. Challenging terrain. Hazard probability high but severity manageable.
	2	HIGH	Response may require use of several technical disciplines; rope rescue, <u>swiftwater</u> and/or <u>avalanche</u> assessment. Difficult terrain. Hazards are high probability and high severity.
Environmental Conditions	0	LOW	Minimal hazards. Good weather, stable forecast, daylight, warm temperatures and/or good visibility. Low elevation.
	1	MODERATE	Moderate hazards. Uncertain forecast, low light, freezing temperature, moderate precipitation and/or broken visibility.
	2	HIGH	Extreme hazards. Impending forecast, drastic weather system, darkness, cold temperatures, heavy precipitation, high wind and/or obscured visibility. High elevation.
Vulnerability	0	LOW	Minimal exposure to personnel. Good searching terrain. <1 hour exposure. <3 searchers exposed. Full 2-way communications.
	1	MODERATE	Moderate exposure to personnel due to activity/environmental hazards and/or weather. Moderate terrain hazards. 1-4 hours exposure. 3-12 searchers exposed. Intermittent communications and/or relay available if required.
	2	HIGH	High exposure due to extreme activity/environmental hazards and/or weather. Broken terrain, talus slopes and/or cliff bands. >6 hours exposure. >12 searchers exposed. Poor or no communications with field personnel.
External Influence	0	LOW	Little or no degree of urgency due to either confirmed survivability or confirmed deceased (recovery). Little or no pressure from family, media or agency.
	1	MODERATE	Some degree of urgency due to subject survivability factors. Local publicity. Family on scene. Agency and/or press asking questions.
	2	HIGH	High degree of urgency due to critical subject survivability factors. High profile subject. Family on scene. Agency, national media influence and/or political pressure to resolve.

RATING GUIDES

RESPONSE CAPABILITY SCORE – GROUND SEARCH

www.nols.edu/wrmc (100) 0-557
 WILDERNESS RISK MANAGEMENT
 WRMIC
 Without the consent of the author 2015
 This document may not be reproduced

1b RESPONSE CAPABILITY SCORE		RATING GUIDE – GROUND SEARCH
Personnel Training	0	HIGH Documented training proficiency appropriate for the activities required. Routinely train on incident site/area. High level of training (SAR Managers, Team Leaders, GSAR).
	1	MODERATE Some training proficiency related to the activities required. Some training on incident site/area. Basic SAR team member training with Team Leader supervision.
	2	LOW Little training proficiency related to the activities required. No training on, or familiarity with the incident site/area. No training in the terrain features. Low search member certification. New search team. Convergent volunteers used.
Personnel Experience	0	HIGH Extensive experience appropriate for the activities required. Routinely respond to incident site/area. >20 similar responses. Many years of recreational experience. Professional experience.
	1	MODERATE Some experience related to the activities required. Some previous responses to site/area. 5-20 similar responses. Significant recreational experience.
	2	LOW Little or no experience related to the activities required. Completely unfamiliar with the location. <5 similar responses. Little or no recreational experience.
Personnel Mental & Physical Preparedness	0	HIGH Personnel are in good spirits, well-rested and exhibit characteristics of a cohesive team.
	1	MODERATE Personnel are generally positive although some are tiring. Adequate physical condition.
	2	LOW Personnel are negative and question decisions (see note on page 13). Resources have been on task through several assignments and are showing signs of exhaustion. Searchers have been involved for multi-operational periods. Unfit/does not exercise on a regular basis.
Planning	0	HIGH Plans (and/or Pre-plans) are in place, including contingencies, all documented.
	1	MODERATE Overall plan is in place, with some consultation. Basic notes taken about the site.
	2	LOW Basic discussions on overall strategies and tactics. Nothing in writing for this site.
Resources	0	HIGH Appropriate resources are in place to cover all anticipated eventualities, contingencies and multi-operational periods.
	1	MODERATE Basic resources are in place to cover response. Back-up is available, but not on site.
	2	LOW Resources are barely adequate. No back-up or contingency available.

Mountain Rescue

3a SAR OPERATION RISK SCORE			RATING GUIDE – MOUNTAIN RESCUE
Operational Complexity	0	LOW	Simple operation. 4 th class terrain. Trail approach. Top-down access, requires only rappelling in. Simple lower <50 meters in length. Straight forward evacuation. One subject. Minor subject injuries.
	1	MODERATE	More complex operation. 5 th class terrain. Knot pass raise and/or lower <100 meters in length. 2 or more subjects with non-life-threatening injuries.
	2	HIGH	Very complex operation. Multiple teams. Convergent volunteers. Difficult access and egress. Multi-pitch raise and/or lower >100 meters in length. Complex evacuation. Life-threatening injuries.
Activity Hazards	0	LOW	Low hazard mountain rescue activities. Low angle alpine site. No site hazards. Simple terrain. Hazards are low probability and low severity.
	1	MODERATE	Moderate hazard mountain rescue activities. Glaciated alpine or steep alpine. Challenging terrain. Site hazards manageable. Hazard probability high but severity manageable.
	2	HIGH	High hazard mountain rescue. Glaciated & steep alpine. Avalanche, rock or icefall hazard likely, CDFL involved. Complex terrain. Site hazards not easily managed. Hazards are high probability and high severity.
Environmental Conditions	0	LOW	Minimal hazards. Good weather, stable forecast, daylight, warm temperatures and/or good visibility. Low elevation.
	1	MODERATE	Moderate hazards. Uncertain forecast, low light, freezing temperature, moderate precipitation and/or broken visibility.
	2	HIGH	Extreme hazards. Impending forecast, drastic weather system, darkness, cold temperatures, heavy precipitation, high wind and/or obscured visibility. High elevation.
Vulnerability	0	LOW	Minimal exposure to personnel. Good terrain to work in. No overhead hazards. <1 hour exposure. 1-2 rescuers exposed.
	1	MODERATE	Moderate exposure to personnel due to terrain/activity/environmental hazards and/or weather. Manageable overhead hazards. Safe zones exist to protect rescuers. 1-4 hours exposure. 2-4 rescuers exposed.
	2	HIGH	High exposure due to extreme terrain/activity/environmental hazards and/or weather. High overhead hazards. Rock fall likely. No safe-zones to protect rescuers. >4 hours exposure. >4 rescuers exposed.
External Influence	0	LOW	Little or no degree of urgency due to either confirmed survivability or confirmed deceased (recovery). Little or no pressure from family, media or agency.
	1	MODERATE	Some degree of urgency due to subject survivability factors. Local publicity. Family on scene. Agency and/or press asking questions.
	2	HIGH	High degree of urgency due to critical subject survivability factors. High profile subject. Family on scene. Agency, national media influence and/or political pressure to resolve.

Mountain Rescue

3b RESPONSE CAPABILITY SCORE		RATING GUIDE – MOUNTAIN RESCUE
Personnel Training	0	HIGH Documented training proficiency appropriate for the activities required. Routinely train on incident site/area. Professional level certification (ACMG Alpine Guide). Instructor level mountain rescue certification.
	1	MODERATE Some training proficiency related to the activities required. Some training on incident site/area. Mountain rescue training with team leader supervision.
	2	LOW Little training proficiency related to the activities or location required. No training on incident site/area. No training in the terrain features. Low mountain rescue certification. New rescue team.
Personnel Experience	0	HIGH Extensive experience appropriate for the activities required. Routinely respond on incident site/area. >20 similar responses. Many years of recreational experience. Professional experience.
	1	MODERATE Some experience related to the activities required. Some previous responses on incident site/area. 5-20 similar responses. Significant recreational experience.
	2	LOW Little or no experience related to the activities required. Completely unfamiliar with the location. <5 similar responses. Little or no recreational experience.
Personnel Mental & Physical Preparedness	0	HIGH Personnel are in good spirits, well-rested and exhibit characteristics of a cohesive team.
	1	MODERATE Personnel are generally positive although some are tiring. Adequate physical condition.
	2	LOW Personnel are negative and question decisions (see note on page 13). Resources have been on task through several assignments and are showing signs of exhaustion. Responders have been involved for multi-operational periods. Unfit/does not exercise on a regular basis.
Planning	0	HIGH Plans (and/or Pre-plans) are in place, including contingencies, all documented.
	1	MODERATE Overall plan is in place, with some consultation. Basic notes taken.
	2	LOW Basic discussions on overall strategies and tactics. Nothing in writing.
Resources	0	HIGH Appropriate resources and team are in place to cover all anticipated eventualities, contingencies and technical requirements.
	1	MODERATE Basic resources and team are in place to cover response. Back-up is available, but not on site.
	2	LOW Resources and team are barely adequate. No back-up or contingency available.

RADeMS REFERENCE GUIDE

8 ½" X 5 ½" SPIRAL-BOUND BOOKLET (WITH 2 CARDS)



www.nols.edu/wrmmc | (800) 710-6657 X3

WILDERNESS RISK MANAGEMENT CONFERENCE



This document may not be reproduced without the consent of the author 2015

- Justice Institute of British Columbia RADEMS website <http://host.jibc.ca/gsar/>
- RADEMS ap

COME HOME SAFE



IT'S NOT JUST THE SUBJECT THAT RELIES ON YOU

COME HOME SAFE



IT'S NOT JUST THE SUBJECT THAT RELIES ON YOU