ICE SAFETY AND RESCUE TRAINING COURSES

EMERGENCY RESPONDERS AND RESCUE TEAMS

About Rescue 3 Europe

Rescue 3 Europe develops state of the art technical rescue courses, providing internationally recognised accreditation for organisations and individuals operating in high risk environments.

As an international accrediting body, Rescue 3 provide up to date best practice guidance that is constantly evolving in line with new research and testing. All changes and developments of Rescue 3 courses go through a process of peer review and oversight by a steering committee made up of industry experts from all over the world.

Rescue 3 training providers deliver courses worldwide, in multiple disciplines, including: rope, water, boat, ice and confined space rescue. Our large suite of courses have been adopted by mountain rescue teams, wind turbine operators, fire and rescue services, ambulance teams, utilities providers, and military personnel.

Within each discipline, Rescue 3 accredited courses cover every level of operations, whether this is at an awareness level, avoiding risks and applying simple safe systems of work; or at more advanced levels where practitioners must acquire high levels of personal skills and understanding to access and navigate difficult environments.

For over four decades Rescue 3 has provided the standard for technical rescue training, offering guidance and support for maintaining best practice.

Rescue3 EUROPE

The course learning outcomes are provided as pre- and post-course reference for people involved in the delivery of Rescue 3 courses (eg Rescue 3 training providers, instructors and students). They are not to be used for any other purpose without the express written permission of Rescue 3 Europe.

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EMERGENCY RESPONDERS AND RESCUE TEAMS

Ice Awareness (IA)

Course overview and target audience

This 4-hour classroom session is geared toward those who supervise emergency responders who respond to incidents on surface ice including frozen lakes, ponds, and rivers.

Participants will be introduced to the due diligence and risk management required for this high risk environment, and understand the various training levels for rescue personnel. The course identifies hazards associated with surface ice and introduces the techniques and equipment that can be used to reduce the risk.

This course does not certify participants for on-ice activities.

Contact hours	**Prerequisites**
3.5 hours (0.5 days)	None
Qualification valid for	**Accredited by**
3 years	Rescue 3 Europe

Taught by

- Ice Awareness Instructor (IAI)
- Ice Rescue Technician Instructor (IRTI)
- Ice Rescue Technician Advanced Instructor (IRTAI)

Assessment

The assessed elements of this course are:

- Foundation knowledge

Ice Awareness (IA) skill sheet contents

Theory
1. Rescue 3 philosophy
2. Training standards
3. Rescue 3 best practice guidelines
4. Risk management and rescuer safety
5. Ice properties, formations and types
6. Ice hazards
7. Hydrology
8. Personal protective equipment
9. Technical and team equipment
10. Management and pre-planning
11. Incident size-up
12. ICS and site control
13. Communications
14. Medical considerations
Practical
15. Knots, bends and hitches

Ice Awareness (IA) learning outcomes and key teaching points

	Skill sheet element		Learning outcome	Key teaching points
1	Rescue 3 philosophy	1.1	Recall the steps required in order to develop competence.	Training, practice, experience, judgement. Self > team > victim
		1.2	Explain the order of priorities at the scene of an ice rescue.	
2	Training standards	2.1	Recognise the different training courses within the Rescue 3 program.	Describe our various courses and explain where the curriculum comes from (this document!) • Describe what it means to be a Technician/Operator/First Responder etc. • Intro to NFPA Standards - 1670 & 1006 • How we meet and exceed these standards • Introduce the Rescue 3 Standard as a truly international standard.
		2.2	Recall and remit the role of an individual trained to a given level.	
		2.3	State how the Rescue 3 program fits within national and international standards.	
		2.4	State how the Rescue 3 program fits within Agency policy and agency Standard Operating Guidelines.	
3	Rescue 3 best practice guidelines	3.1	Apply the Rescue 3 best practice guidelines to produce safe working practice.	These were formerly called "The Absolutes". (See the manual or presentation for a list.) Teaching Tip: Consider using some video to highlight good and bad examples.
4	Risk management and rescuer safety	4.1	Recall the steps to perform a risk benefit analysis.	Identifying risk - actual vs perceived risk • Greatest risk populations • Reducing risk • Hazard curve paradox • Risk benefit analysis • Rescue vs recovery • General hazards water/ice rescue • Past experience - why have ice rescues fallen apart? • Rehabilitation considerations • Site specific safety considerations • Negligence and best protection
		4.2	Recall measures to minimize risks to both your rescuers and the organization.	
5	Ice properties, formations and types	5.1	Recall the factors that affect ice formation and strength.	• Factors affecting ice formation • River ice vs lake ice • Ice types • Factors affecting ice strength • Ice thickness minimums
		5.2	Recognize the various types of ice and recall their corresponding properties.	

	Skill sheet element		Learning outcome	Key teaching points
6	Ice hazards	6.1	Recognize ice specific hazards that may affect rescuer safety.	• Fluctuating water levels, • Thermal constriction and expansion • Cracking • Radiant heating • Overflow • Dynamic ice • Floating ice • Anchor ice
7	Hydrology	7.1	Identify the effect that volume, gradient and obstacles have on water.	Key idea: Rivers are powerful and relentless but predictable. (See the Powerpoint presentation for a complete outline of the curriculum related to this Standard.) Teaching Tip: Relate how basic river features and hydrology will effect the formation of ice and assist in size up of an operation and risk benefit analysis. Our IRT course covers basic Ice Rescue for frozen bodies of water or mantle based rescue for slow moving rivers. Those individuals or teams who work or respond to large volume or fast rivers with open leads should take our Ice Rescue Technician - Advanced course.
		7.2	Identify water features, hazards and suitable control measures.	
		7.3	Describe the impact these features would have on an individual's ability to self rescue and perform surface Ice Rescue.	
		7.4	Understand the hazards of moving water and the limitations of basic surface ice rescue techniques.	
		7.5	Describe how hydrology will affect the formation of ice.	
8	Personal protective equipment	8.1	Identify PPE and Equipment used for in-water or on ice operations.	Thoroughly outline the pros/cons and differences for survival, dry, and ice rescue suits. • Care and maintenance of PPE • While Mustang Ice Commander Suits are not considered an approved PFD, we do not feel that a PFD needs to be worn on top of it. The suits provide adequate flotation for static surface ice rescue. • During advanced ice rescue operations (moving water) standard swift water PPE should be worn (drysuit, helmet and PFD). • All students need to know how to improvise a chest harness with webbing for ice rescue operations. • All students should also be able to put a chest harness on a subject. Practice on dry land first. Use a double larksfoot with or without a shoulder loop.
		8.2	Select appropriate PPE for a technician, performance checks, donning and buddy checks.	
		8.3	Recall post-use care and inspection procedures.	

	Skill sheet element		Learning outcome	Key teaching points
9	Technical and team equipment	9.1	Select the correct application for technical equipment used in Surface Ice Rescue.	• Why we use non locking wiregate karabiners • How to use two wiregates to create a solid attachment (gates opposite and opposed) • Basics of how to load a karabiner • Rescue pulleys • Webbing • Overview of the properties of polypropylene, Spectra/Spectrex/ Dyneema, nylon, polyester and hollow core • Ice screws • Ice rescue tether kits - commercial and improvised • Ice rescue reels • Cold water rescue slings • Reach poles • Sleds/boards/boats when appropriate • Go over how to maintain and inspect equipment • Equipment lifecycles
		9.2	Recall post-use care and inspection procedures for technical and team equipment.	
10	Management and pre-planning	10.1	List the four components for a generic pre-plan.	Try to make this as specific to the group and their environment as possible. (See Powerpoint presentations for a more complete overview of this session.)
		10.2	Identify sources of information useful for generic and task location specific pre-planning.	
		10.3	Describe key information that should be included in a pre-plan.	

	Skill sheet element		Learning outcome	Key teaching points
11	Incident size-up	11.1	List rescue options.	• Talk, Reach, Throw, Row, Go, Tow – NO! • This "mantra" should be presented as a tactical toolbox rather than a linear list of options. Choose the lowest risk option with the highest chance of success. Size Up • Facts • Probabilities • Situation • Decision • Plan L.A.S.T. T.E.M.P.O. Note: Conditional rescue refers to rescues that rely on the subject to assist such as reach or throw style rescues. True rescues, such as contact rescues, do not require the assistance of the subject. TIP: Consider showing some video of actual events
		11.2	Explain the difference between true and conditional rescues.	
12	ICS and site control	12.1	Perform a risk assessment of the rescue site.	• I.C.S. • Benefits of I.C.S. • Safety officer roles and responsibilities • Basic structure • Roles • Highlight its ability to adapt to the size of the incident (shrink or grow) • Span of control • Operational zones and site control • Low to high risk rescue options • Communication and common barriers to good communication. • Incident termination
		12.2	Based on hazard recognition, apply appropriate control measures.	
		12.3	Apply different roles that may be allocated at a surface ice incident, including prepositioned personnel.	
		12.4	Collate relevant information in order to deliver structured messages regarding an incident.	
		12.5	Apply a simple structure and centralized command, in order to brief and manage a team.	

	Skill sheet element		Learning outcome	Key teaching points
13	Communications	13.1	Using hand signals, be able to communicate the following: ok, help, stop, left, right, need medical assistance.	Hand Signals • OK - One hand (open or closed fist) tapping the top of head • Help - One or two hands waving overhead • Stop - Arms out straight making a T, one fist raised or arm outstretched in front with palm forward • Left - Point left • Right - Point right • Need medical assistance - cross arms over the chest. Hand signals should be repeated once to confirm message received. Whistle Signals • Stop/Attention - One blast • Up Stream - Two blasts • Downstream - Three blasts • Emergency - Continuous blasts Local variations may exist. Ensure that you are familiar with all local teams' signals.
		13.2	Using whistle signals, be able to communicate the following: stop, upstream, downstream and emergency.	
		13.3	Identify barriers to communications and limitations of hand and whistle signals.	
14	Medical considerations	14.1	Identify the affects of cold water immersion on the body.	• Define cold water as anything less than 21 degrees Celsius. Define cold shock, cold incapacitation, acute hypothermia and circum-rescue collapse. • Cold water gasp reflex, shell to core shunting of blood • Autonomic Conflict • Submersion Injuries and drowning • 1-10-1 rule as it applies to static water ice submersion. • Mild and severe hypothermia • Parbuckling - how and why • Submersion Injury • Resuscitation recommendations • Decontamination procedures as per flood rescue curriculum.
		14.2	Identify signs, symptoms and treatments for mild/severe hypothermia and drowning.	
		14.3	Identify personnel at risk to the previous medical conditions and control measures put in place to minimize this.	
		14.4	Apply techniques that minimize exposure to the water and decontamination procedures post-exposure.	

	Skill sheet element		Learning outcome	Key teaching points
15	Knots, bends and hitches	15.1	Be able to tie, identify and check the knots that may be required for a surface ice rescue.	• How and why do knots reduce the tensile strength of a rope. • Common terminology Knots • Figure Eight Stopper • Figure Eight Bend • Figure Eight Follow through • Figure Eight on a bight • Directional 8 or Alpine Butterfly • Double overhand Bend (Double Fisherman's) • Overhand Bend in webbing Note: At this point you do not need to have a stopper knot so long as you have a palm's width of tail coming from your knot (Figure 8 family) Hitches • Clove Hitch • Munter Hitch • Prusik Hitch • Klemheist or autoblock - works well in cold conditions when a prusik may fail. Note: If a clove hitch is used as termination knot it should also be backed up with an overhand stopper knot. Note: Consider using Sterling Hollow Block prusik cord as well, as it tends to bight better on the host rope when it is wet or icy. TIP: It is a good idea to build good habits early on. Have your students get used to dressing and setting knots as well.
		15.2	Recall factors affecting know choice for surface ice rescue applications.	

Ice Rescue Technician (IRT)

Course overview and target audience

The Ice Rescue Technician (IRT) course is valuable training for emergency responders who may have to venture onto surface ice to perform a rescue. In a rescue situation, it is already clear that the ice is unsafe, and therefore this course does not spend a lot of time on ice formation and determining its strength. Rather, the emphasis is on self rescue and the full range of techniques and specialized equipment that can be used for rescuing others. The curriculum also includes the significant medical considerations for patient packaging and extrication posed by cold water immersion.

This course also includes an overview of skills and knowledge necessary for responding to incidents on surface ice over moving water, but for those who can expect a high frequency of callouts on large volume rivers with open leads, you will need to the Ice Rescue Technician Advanced (IRTA).

Contact hours	**Prerequisites**
12 hours (2 days)	Must be a confident swimmer. Minimum age: 18
Qualification valid for	**Accredited by**
3 years	Rescue 3 Europe

Taught by

- Ice Rescue Technician Instructor (IRTI)
- Ice Rescue Technician Advanced Instructor (IRTAI)

Assessment

The assessed elements of this course are:

- Foundation knowledge
- Knots and anchors
- Mechanical advantage
- Ice testing procedures
- Self-rescue techniques

Ice Rescue Technician (IRT) skill sheet contents

Theory
1. Rescue 3 philosophy
2. Training standards
3. Rescue 3 best practice guidelines
4. Risk management and rescuer safety
5. Ice properties, formations and types
6. Ice hazards
7, Hydrology
8. Personal protective equipment
9. Technical and team equipment
10. Management and pre-planning
11. Incident size-up
12. ICS and site control
13 Communications
14. Medical considerations
15. Animal rescue considerations
Practical
16. Knots, bends and hitches
17. Anchor systems
18. Tensioning systems and mechanical advantage
19. Ice testing procedures
20. Walking on ice
21. Self-rescue techniques
22. Conditional rescues
23. True rescues (contact rescues)
24. Rescue craft
25. Scenarios
If applicable to agency
26. Inflated fire hose (if applicable to agency)
27. Ladder rescue techniques (if applicable to agency)
28. Co-worker rescue (if applicable to agency)
29. Rope assisted self-rescue/belay techniques (if applicable to agency)
30. Equipment recovery strategies (if applicable to agency)

'If used by agency' skills must be taught if a student's agency uses these skills operationally. Otherwise, they may be omitted by the training provider.

Ice Rescue Technician (IRT) learning outcomes and key teaching points

	Skill sheet element		Learning outcome	Key teaching points
1	Rescue 3 philosophy	1.1	Recall the steps required in order to develop competence.	Training, practice, experience, judgement.
		1.2	Explain the order of priorities at the scene of an ice rescue.	Self > team > victim
2	Training standards	2.1	Recognise the different training courses within the Rescue 3 program.	Describe our various courses and explain where the curriculum comes from (this document!) • Describe what it means to be a Technician/Operator/First Responder etc. • Intro to NFPA Standards - 1670 & 1006 • How we meet and exceed these standards • Introduce the Rescue 3 Standard as a truly international standard.
		2.2	Recall and remit the role of an individual trained to a given level.	
		2.3	State how the Rescue 3 program fits within national and international standards.	
		2.4	State how the Rescue 3 program fits within Agency policy and agency Standard Operating Guidelines.	
3	Rescue 3 best practice guidelines	3.1	Apply the Rescue 3 best practice guidelines to produce safe working practice.	These were formerly called "The Absolutes". (See the manual or presentation for a list.) Teaching Tip: Consider using some video to highlight good and bad examples.
4	Risk management and rescuer safety	4.1	Recall the steps to perform a risk benefit analysis.	Identifying risk - actual vs perceived risk • Greatest risk populations • Reducing risk • Hazard curve paradox • Risk benefit analysis • Rescue vs recovery • General hazards water/ice rescue • Past experience - why have ice rescues fallen apart? • Rehabilitation considerations • Site specific safety considerations • Negligence and best protection
		4.2	Recall measures to minimize risks to both your rescuers and the organization.	
5	Ice properties, formations and types	5.1	Recall the factors that affect ice formation and strength.	• Factors affecting ice formation • River ice vs lake ice • Ice types • Factors affecting ice strength • Ice thickness minimums
		5.2	Recognize the various types of ice and recall their corresponding properties.	

	Skill sheet element		Learning outcome	Key teaching points
6	Ice hazards	6.1	Recognize ice specific hazards that may affect rescuer safety.	• Fluctuating water levels, • Thermal constriction and expansion • Cracking • Radiant heating • Overflow • Dynamic ice • Floating ice • Anchor ice
7	Hydrology	7.1	Identify the effect that volume, gradient and obstacles have on water.	Key idea: Rivers are powerful and relentless but predictable. (See the Powerpoint presentation for a complete outline of the curriculum related to this Standard.) Teaching Tip: Relate how basic river features and hydrology will effect the formation of ice and assist in size up of an operation and risk benefit analysis. Our IRT course covers basic Ice Rescue for frozen bodies of water or mantle based rescue for slow moving rivers. Those individuals or teams who work or respond to large volume or fast rivers with open leads should take our Ice Rescue Technician - Advanced course.
		7.2	Identify water features, hazards and suitable control measures.	
		7.3	Describe the impact these features would have on an individual's ability to self rescue and perform surface Ice Rescue.	
		7.4	Understand the hazards of moving water and the limitations of basic surface ice rescue techniques.	
		7.5	Describe how hydrology will affect the formation of ice.	
8	Personal protective equipment	8.1	Identify PPE and Equipment used for in-water or on ice operations.	Thoroughly outline the pros/ cons and differences for survival, dry, and ice rescue suits. • Care and maintenance of PPE • While Mustang Ice Commander Suits are not considered an approved PFD, we do not feel that a PFD needs to be worn on top of it. The suits provide adequate flotation for static surface ice rescue. • During advanced ice rescue operations (moving water) standard swift water PPE should be worn (drysuit, helmet and PFD). • All students need to know how to improvise a chest harness with webbing for ice rescue operations. • All students should also be able to put a chest harness on a subject. Practice on dry land first. Use a double larksfoot with or without a shoulder loop.
		8.2	Select appropriate PPE for a technician, performance checks, donning and buddy checks.	
		8.3	Recall post-use care and inspection procedures.	

	Skill sheet element		Learning outcome	Key teaching points
9	Technical and team equipment	9.1	Select the correct application for technical equipment used in Surface Ice Rescue.	• Why we use non locking wiregate karabiners • How to use two wiregates to create a solid attachment (gates opposite and opposed) • Basics of how to load a karabiner • Rescue pulleys • Webbing • Overview of the properties of polypropylene, Spectra/ Spectrex/ Dyneema, nylon, polyester and hollow core • Ice screws • Ice rescue tether kits - commercial and improvised • Ice rescue reels • Cold water rescue slings • Reach poles • Sleds/boards/boats when appropriate • Go over how to maintain and inspect equipment • Equipment lifecycles
		9.2	Recall post-use care and inspection procedures for technical and team equipment.	
10	Management and pre-planning	10.1	List the four components for a generic pre-plan.	Try to make this as specific to the group and their environment as possible. (See Powerpoint presentations for a more complete overview of this session.)
		10.2	Identify sources of information useful for generic and task location specific pre-planning.	
		10.3	Describe key information that should be included in a pre-plan.	
11	Incident size-up	11.1	List rescue options.	• Talk, Reach, Throw, Row, Go, Tow – NO! • This "mantra" should be presented as a tactical toolbox rather than a linear list of options. Choose the lowest risk option with the highest chance of success. Size Up • Facts • Probabilities • Situation • Decision • Plan L.A.S.T. T.E.M.P.O. Note: Conditional rescue refers to rescues that rely on the subject to assist such as reach or throw style rescues. True rescues, such as contact rescues, do not require the assistance of the subject. TIP: Consider showing some video of actual events
		11.2	Explain the difference between true and conditional rescues.	
		11.3	Relative to the remit of a Technician, select an appropriate plan of action for the personnel and subject present.	

	Skill sheet element		Learning outcome	Key teaching points
12	ICS and site control	12.1	Perform a risk assessment of the rescue site.	• I.C.S. • Benefits of I.C.S. • Safety officer roles and responsibilities • Basic structure • Roles • Highlight its ability to adapt to the size of the incident (shrink or grow) • Span of control • Operational zones and site control • Low to high risk rescue options • Communication and common barriers to good communication. • Incident termination
		12.2	Based on hazard recognition, apply appropriate control measures.	
		12.3	Apply different roles that may be allocated at a surface ice incident, including prepositioned personnel.	
		12.4	Collate relevant information in order to deliver structured messages regarding an incident.	
		12.5	Apply a simple structure and centralized command, in order to brief and manage a team.	
13	Communications	13.1	Using hand signals, be able to communicate the following: ok, help, stop, left, right, need medical assistance.	Hand Signals • OK - One hand (open or closed fist) tapping the top of head • Help - One or two hands waving overhead • Stop - Arms out straight making a T, one fist raised or arm outstretched in front with palm forward • Left - Point left • Right - Point right • Need medical assistance - cross arms over the chest. Hand signals should be repeated once to confirm message received. Whistle Signals • Stop/Attention - One blast • Up Stream - Two blasts • Downstream - Three blasts • Emergency - Continuous blasts Local variations may exist. Ensure that you are familiar with all local teams' signals.
		13.2	Using whistle signals, be able to communicate the following: stop, upstream, downstream and emergency.	
		13.3	Identify barriers to communications and limitations of hand and whistle signals.	

	Skill sheet element		Learning outcome	Key teaching points
14	Medical considerations	14.1	Identify the affects of cold water immersion on the body.	• Define cold water as anything less than 21 degrees Celsius. Define cold shock, cold incapacitation, acute hypothermia and circum-rescue collapse. • Cold water gasp reflex, shell to core shunting of blood • Autonomic Conflict • Submersion Injuries and drowning • 1-10-1 rule as it applies to static water ice submersion. • Mild and severe hypothermia • Parbuckling - how and why • Submersion Injury • Resuscitation recommendations • Decontamination procedures as per flood rescue curriculum.
		14.2	Identify signs, symptoms and treatments for mild/severe hypothermia and drowning.	
		14.3	Identify personnel at risk to the previous medical conditions and control measures put in place to minimize this.	
		14.4	Apply techniques that minimize exposure to the water and decontamination procedures post-exposure.	
15	Animal rescue considerations	15.1	Identify hazards and control measures associated with animal rescue	• Go over Best Practice Guidelines for Animal Rescue • Identify the tactical differences between large and small animals. • Introduction to tools that may assist in extrication and transport • Risk Benefit analysis – Why perform animal rescue • Some basics of animal behaviour Note – This is a very common scenario for emergency response teams. Give it an appropriate amount of attention. Use the presentation as a guideline. We also have a few good videos (Calgary and Edmonton AB to use as case studies. Consider a scenario with an animal rescue component.
		15.2	Identify extrication and transport considerations for animal rescue	

	Skill sheet element		Learning outcome	Key teaching points
16	Knots, bends and hitches	16.1	Be able to tie, identify and check the knots that may be required for a surface ice rescue.	• How and why do knots reduce the tensile strength of a rope. • Common terminology Knots • Figure Eight Stopper • Figure Eight Bend • Figure Eight Follow through • Figure Eight on a bight • Directional 8 or Alpine Butterfly • Double overhand Bend (Double Fisherman's) • Overhand Bend in webbing Note: At this point you do not need to have a stopper knot so long as you have a palm's width of tail coming from your knot (Figure 8 family) Hitches • Clove Hitch • Munter Hitch • Prusik Hitch • Klemheist or autoblock - works well in cold conditions when a prusik may fail. Note: If a clove hitch is used as termination knot it should also be backed up with an overhand stopper knot. Note: Consider using Sterling Hollow Block prusik cord as well, as it tends to bight better on the host rope when it is wet or icy. TIP: It is a good idea to build good habits early on. Have your students get used to dressing and setting knots as well.
		16.2	Recall factors affecting know choice for surface ice rescue applications.	

	Skill sheet element		Learning outcome	Key teaching points
17	Anchor systems	17.1	Be able to select an appropriate single anchor point and create an attachment point using rope and webbing.	Ice Screws • How to place them • Tying off short • Estimating strengths Note: Based on our own ice rescue tests we do not need to teach students how to use multiple ice screws and create a load distributing/sharing multi point anchor. One ice screw in white river ice failed between 20-24kN. This is stronger than most rope used in an ice rescue. Given that we are usually pulling PEOPLE over the ice mantle this should be AMPLE strength. Load distributing anchors may be shown as an option for snow machine recovery etc. • Natural anchors • Basket Hitch • Vehicle anchors • Snow machines trucks • Quads
		17.2	How to place and utilize an ice screw as an effective anchor point.	

	Skill sheet element		Learning outcome	Key teaching points
18	Tensioning systems and mechanical advantage	18.1	Identify the need for mechanical advantage systems when tensioning or moving loads.	An emergency response team working on an ice rescue incident will likely have little need for MA on a basic rescue. We can only pull so hard on the person who is in the water before we injure them. For more than one person on a 3:1 you should likely re-think your tactic ... pulling harder may not be the answer. For small teams, rescues far from shore, or field services personnel a simple 2:1 or 3:1 are key skills. Start with a non-ratcheting system. If time and temperature permit add progress capture and haul cams. During a basic ice rescue there will not be constant force on the rope so a progress capture may not even be necessary. For more advanced rescue situations, setting up containment or equipment recovery full ratcheting systems may be required. Consider mechanical rope grabs or webbing friction hitches such as the auto block which may hold better on icy ropes than a traditional prusik. TIP: Using clothes pins to help illustrate the "T" system provides a great visual to the students.
		18.2	Build and check simple 2:1 and 3:1 systems that can be reset and capture progress.	

	Skill sheet element		Learning outcome	Key teaching points
19	Ice testing procedures	19.1	Perform an assessment of the ice to determine its thickness and relative strength.	This is an important skill for advanced ice or difficult access situations. Rescue teams will assume weak ice and should always be prepared for the worst. Those who work on the ice may need to test the ice often to ensure they do not fall through. Keep it Simple - Have one line tender body belay (or just hold the rope) while a second person advances onto the ice. Once off shore the leader should test the ice by placing an ice screw. Type and depth of ice can be determined through feel as the screw moves downward. While this is fairly conservative, 4 inches of clear ice is considered safe ice. Therefore 8 inches of white ice is also safe. Assuming the ice test reveals safe ice. The belayer can then advance across the same path as the leader and reset the belay at the test hole. Repeat as needed. Frequency of test holes will depend on how consistent the data is and what the consequences of falling though are.
		19.2	Perform a basic belay technique and line tend for a lead rescuer who is performing ice testing procedures.	
20	Walking on ice	20.1	Demonstrate weak ice procedures.	Students should be taught to test the ice if they are unsure or unprepared to fall through. At any point if the ice begins to crack or pop the should gently lower their weight until they are crawling or sliding on their belly. Don't run or drop down to the ice. If walking in a group the group should spread out and get low. Getting low not only distributes your weight better but it also decreases the consequences of breaking though. You will be less likely to injure yourself and will likely be able to keep your head above water lessening the cold water gasp reflex. Retreat to safe ice by sliding or crawling back towards the shoreline following the same path you came from.
		20.2	Demonstrate how to retreat back to safe ice.	
		20.3	Demonstrate how to minimize risks associated with walking on ice.	
		20.4	Determine when ice is safe to walk on.	

	Skill sheet element		Learning outcome	Key teaching points
21	Self-rescue techniques	21.1	Demonstrate the ability to self rescue from a fall through the ice into water.	This should be a slow progression. Some people will be terrified to get in for the first time. Ideally try this first with a good ice mantle. Do a demo so the students can SEE what good technique looks like. For the first evolution try without ice picks. Good technique looks like this: • Get as much of your upper body on the ice as possible. • Get your elbows out in front of your body and put your head down on your arms or the ice. • Kick your feet • Start to crawl "army style" with your arms while keeping your head down and kicking • Get a knee up on the ice • Continue to belly slide/crawl or roll away from the weak ice. Students will have the tendency to try to use strength and get out the same way they would in a pool. Often this will work during courses if we have a solid ice mantle. Remind them that if they fell through for REAL they would likely have a weaker mantle. Try the same process again with ice picks. You will notice that some students who got out without picks CAN'T get out with picks. If this is the case it is likely because they are no longer using good technique and are trying to muscle out!

	Skill sheet element		Learning outcome	Key teaching points
22	Conditional rescues	22.1	Identify rescue options and the limitations of conditional rescues.	They must first evaluate the subject's condition to determine which tactic to employ. If the subject is NOT wearing a PFD the first step will be to get them something that floats. This can be thrown or pushed to them. Remember this course is SURFACE water rescue….. not dive rescue. If they have flotation on and are not in a moving water environment there is no need to rush. Take the time to get things organized before proceeding. Emphasize the importance of good coaching. If we can talk them through a self rescue that is likely the best bet. For a reach rescue to work the subject still needs to have a decent amount of strength. Try to pick a system where by the subject does not rely on grip strength alone. Throw rescues are often more practical because you can often reach the subject at a further distance and they can wrap the rope around their arms to minimize the need for grip strength. IT IS OK to ask the subject to "wrap" the rope around their arm a number of times. Throwing or pushing out a rescue sling would be ideal as it can be placed around their body AND if floats. Teach standard underarm throws and basic coiling techniques. TIP: When possible set up multiple stations. Keep people moving. You will have a limited amount of time to keep people engaged in the cold.
		22.2	Identify, check and prepare suitable equipment for performing a conditional rescue.	
		22.3	Perform conditional rescues in a variety of locations including talk reach and throw.	
		22.4	Assess subject and environment in order to perform conditional rescues. They must first evaluate the subject's condition to determine which tactic to employ. If the subject is NOT wearing a PFD the first step will be to get them something that floats. This can be thrown or pushed to them. Remember this course is SURFACE water rescue….. not dive rescue. If they have flotation on and are not in a moving water environment there is no need to rush. Take the time to get things organized before proceeding. Emphasize the importance of good	

	Skill sheet element		Learning outcome	Key teaching points
23	True rescues (contact rescues)	23.1	Demonstrate the ability to don an improvised chest harness.	Contact rescues will be required for unresponsive casualties or those who do not possess the strength to hold onto a rope. A good chest harness for ice rescue will have an attachment point high on the sternum. Often times the quick release belt on a Type V PFD sits too low. A harness that is too low will only pull the subject into the ice … not on top of it. Key Points • Show them how to improvise a tether system with a throw rope and how to connect to the system. • Talk them through good line tending • Pick an appropriate line of approach that will not break the ice in front of the subject. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. • Don't forget about the casualties body position • Ideally the rescuer will not get into the water but they may need to if the subject cannot assist in getting their body into a good position. TIP: Ideally you should set up multiple stations to keep people moving and warm. Have students who are not participating practice something else. Anchors, throw bags etc. Keep 'em moving!
		23.2	Demonstrate the ability to connect to the integrated harness on an ice rescue suit.	
		23.3	Determine a safe and appropriate line of approach to the subject.	
		23.4	Demonstrate the ability to secure the subject to the rope system with commercially available systems and improvised techniques.	
		23.5	Demonstrate accurate rope management that ensures the rescuer is not impeded and the belay is robust enough to handle the load.	
		23.6	Demonstrate the ability to extricate the subject from the water onto the ice mantle.	
		23.7	Demonstrate the ability to construct a simple mechanical advantage system.	
		23.8	Demonstrate the ability to perform an off ice mantle rescue to a floating subject in non-moving water.	

	Skill sheet element		Learning outcome	Key teaching points
24	Rescue craft	24.1	Recognize the basic features, care and matinee of a given rescue craft.	Ideally students will have an opportunity to try both a board and a sled. Let them choose which one makes the most sense for their environment. Boats Oceanid's Rapid Deployment Craft (RDC) is the craft of choice for most teams. However you should do some research ahead of time to know what the team is using and prepare accordingly. Note: It is our opinion that rescuers should NOT be tethered into the boat. This provides unnecessary complexity. Key Points • Show them how to use a commercial tether system and improvise a tether system with a throw rope and how to connect to the boat. • Teach them to work from within the boat or at least in contact with the boat at all times. • Talk them through good line tending • Approach the subject head on and stop before they push them off the ice. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. Teach them how to lift the subject into the boat.
		24.2	Demonstrate the ability to prepare the craft for use.	
		24.3	Demonstrate the ability to efficiently move the craft over the ice.	
		24.4	Demonstrate how to efficiently and safely utilize the craft to assist in the extrication and rescue of a subject who is in the water.	
		24.5	Demonstrate the ability to line tend a rescue craft during a surface ice rescue.	

	Skill sheet element		Learning outcome	Key teaching points
	Rescue craft (continued)			Sleds Rescue boards range in complexity from a basic rescue board to a rescue sled. For the most part it is our opinion that an RDC style craft is a better choice for most teams offering the most security, versatility and least amount of complexity. However a rescue board can also be cheap, simple and do the trick. Sleds are more complex, specialized pieces of equipment and some require adequate training time to be proficient with. Some are so specialized they tend to be "one trick ponies." The advantages of a rescue board or sled are: • When used correctly they make the subject's transition from in the water to on the ice smoother. Patients can also be kept in a more horizontal position which may prove beneficial if they are severely hypothermic. • Sleds have runners which allow them to glide more easily over the ice. This may be ideal if access is over very thin ice with little snow cover (high wind areas with weak ice). However they do not work well in deep snow. • Non-inflatable boards/sleds are immediately deployable.. Key Points • Show them how to use a commercial tether system and improvise a tether system with a throw rope and how to connect to the board. • Teach them how to advance the board to the subject • Talk them through good line tending • Approach the subject head on and stop before they push them off the ice. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. Teach them how to lift the subject into the boat
25	Scenarios	25.1	Complete an ice rescue scenario	Ice rescue scenarios

	Skill sheet element		Learning outcome	Key teaching points
26	Inflated fire hose (if applicable to agency)	26.1	Students should be able to inflate and deflate a section of hose, and identify the hazards of working with compressed air	• When the hose is filled with air it floats and remains rigid enough to be passed to a subject or across a stream. If can be used as a reach device during ice rescues. • If you fold the end of the hose over a few feet and tie it with webbing before inflating it will create a loop. • User can also slide back to safe ice while remaining on top of the hose to help distribute their weight. This may allow the rescuer to access or egress over weak ice as well. eg Mark V Hose Inflation System sold by Rescue Source (RQ3). The Mark V Kit includes: • 2 1/2" NH Standard female aluminium hose cap with tie down for securing safety lines. • 2 1/2" NH Standard male aluminium hose cap with standard quick disconnect to attach filler hose. There is also a tie down on this end for securing a safety line. • Pressure relief valve set at 35-40lbs. for safety. • Shield to protect fittings. • SCBA high pressure valve and wheel with hose so you can fill from your own high pressure SCBA bottles.
		26.2	Perform reach rescues with a fire hose in a flat water environment, identifying the limitations.	

	Skill sheet element		Learning outcome	Key teaching points
27	Ladder rescue techniques (if applicable to agency)	27.1	Perform reach rescues with a fire hose in a flat water environment, identifying the limitations and hazards.	"Tilt" technique: • Uses the leverage created by the ladder to help bring the subject horizontal. The ladder will also glide nicely on ice making the transition onto the mantle much easier on both the rescuers and the subject. For this technique to work well, you need a fairly solid ice mantle and a subject who can assist somewhat by hanging onto the ladder. • Advance the ladder until the subject can just reach and grab it. Slowly raise the rescuer end, letting the other end drop below the water's surface about 3'. • Ask them to pull themselves onto the ladder and get a good grip. • Lower the rescuer end of the ladder back down to horizontal which raises the subject out of the water • Slowly pull the ladder (and the subject) onto the ice.

	Skill sheet element		Learning outcome	Key teaching points
28	Co-worker rescue (one person rescue techniques) (if applicable to agency)	28.1	Perform a risk benefit analysis to determine which ice rescue tactics are feasible.	Often field service personnel work in teams of two. If one person falls through the ice, it will be up to the other to affect the rescue. This may be as easy as throwing a rope or talking the subject out of the water. However a need exists to train for the worst case scenario … a subject who is not able to assist in their own extrication. • To do this in a protected fashion the rescuer should: • First establish an anchor • Connect a rope and rope grab to the rope so they can walk/ crawl out to the subject. The rope grab should be connected to their harness (improvised chest harness or ice rescue suit). • Once contact has been made with the subject they can be secured to the end (or any point in the rope via a butterfly knot) of the rope via a cold water rescue sling, webbing harness or into the rope itself. • The rescuer can then retreat back to safe ice and pull the subject out. If the rescuer is unable to pull the subject out a mechanical advantage system will need to be integrated. There are many different ways to accomplish this. Choose a way that is as simple as possible using readily available equipment.
		28.2	Demonstrate the ability to set up a rescue system that allows the rescuer to access and secure a waterborne subject.	
		28.3	Demonstrate the ability to extricate the subject from the water and back to safe ice with only one rescuer.	
		28.4	Demonstrate the ability to construct and utilize a simple mechanical advantage system.	
29	Rope assisted self-rescue/belay techniques (if applicable to agency)	29.1	Perform a risk benefit analysis to determine when a rope assisted self belay should be utilized.	The intention of this is to give students a means to access unknown or weak ice with the support of a rope system designed to assist them in their rescue should they fall through the ice. One approach would be a 2:1 self belay system.
		29.2	Set up a rope system which allows the worker to access weak ice and will assist in self rescue should it be required.	
		29.3	Demonstrate the ability to self rescue given a rope system with mechanical advantage.	

	Skill sheet element		Learning outcome	Key teaching points
30	Equipment recovery strategies (if applicable to agency)	30.1	Perform a risk benefit analysis to determine if equipment recovery is feasible.	This standard primarily exists for field service personnel but it may be useful for some rescue teams as well. The intent is to provide some tools for retrieving equipment such as a snow machine that has broken through the ice but has not sunk under the surface of the water. If a snow machine was to partially break through the ice the first step would be to try to pull it out with a standard ice anchor and MA system. If this cannot be achieved the next step may be to try and elevate as much of the machine out of the water as possible so that it does not freeze in that position. This can be accomplished by improvising a tripod to create an artificial high directional. Supports for the feet of the tripod should be fabricated from plywood or other improvised material to distribute the weight as to ensure it does not break through the ice. Once the machine is lifted high enough it can be pulled onto stable ice. If this cannot be accomplished then spruce boughs or other material can be packed under the machine to help increase its footprint and prevent it from freezing into the ice while additional help arrives.
		30.2	Recall the considerations for use of a tripod or artificial high directional to assist with extrication.	
		30.3	Demonstrate the ability to construct a simple mechanical advantage rope system to assist in extricating equipment from below the ice.	

Ice Rescue Technician Advanced (IRTA)

Course overview and target audience

For personnel who operate on frozen, large volume rivers with open leads.

This course covers all of the skills taught in Ice Rescue Technician (IRT), as well as addressing the substantially higher-risk environment encountered when working on large volume rivers with open leads. Also covered are size up, risk analysis, and hazard mitigation, PPE considerations, self-rescue techniques, and throwbagging. Scenario-based training using both standard and improvised ice rescue equipment will be carried out.

This course can also be taught as a 1 day upgrade for students who have already completed the Ice Rescue Technician (IRT) course and hold an in-date Swiftwater and Flood Rescue Technician (SRT) qualification.

Contact hours	**Prerequisites**
18 hours (3 days)	Must be a confident swimmer. Minimum age: 18 Rescue 3 Swiftwater and Flood Rescue Technician (SRT)
Qualification valid for	**Accredited by**
3 years	Rescue 3 Europe

Taught by

- Ice Rescue Technician Advanced Instructor (IRTAI)

Assessment

The assessed elements of this course are:

- Foundation knowledge
- Knots and anchors
- Mechanical advantage
- Ice testing procedures
- Self-rescue techniques

Ice Rescue Technician (IRTA) skill sheet contents

Theory
1. Rescue 3 philosophy
2. Training standards
3. Rescue 3 best practice guidelines
4. Risk management and rescuer safety
5. Ice properties, formations and types
6. Ice hazards
7, Hydrology
8. Personal protective equipment
9. Technical and team equipment
10. Management and pre-planning
11. Incident size-up
12. ICS and site control
13 Communications
14. Medical considerations
15. Animal rescue considerations
Practical
16. Knots, bends and hitches
17. Anchor systems
18. Tensioning systems and mechanical advantage
19. Ice testing procedures
20. Walking on ice
21. Self-rescue techniques
22. Conditional rescues
23. True rescues (contact rescues)
24. Rescue craft

Practical - swiftwater/ice river
25. Swimming techniques (swiftwater/ice river)
26. Mantle-based conditional rescue (swiftwater/ice river)
27. Mantle-based true rescues (swiftwater/ice river)
28. Mantle-based craft rescues (swiftwater/ice river)
29. Off-mantle rescuer-based rescues (swiftwater/ice river)
30. Off-mantle craft-based rescues (swiftwater/ice river)
31. Downstream containment strategies
32. Scenarios
If applicable to agency
33. Inflated fire hose (if applicable to agency)
34. Ladder rescue techniques (if applicable to agency)
35. Co-worker rescue (if applicable to agency)
36. Rope assisted self-rescue/belay techniques (if applicable to agency)
37. Equipment recovery strategies (if applicable to agency)

'If used by agency' skills must be taught if a student's agency uses these skills operationally. Otherwise, they may be omitted by the training provider.

Ice Rescue Technician Advanced (IRTA) learning outcomes and key teaching points

	Skill sheet element		Learning outcome	Key teaching points
1	Rescue 3 philosophy	1.1	Recall the steps required in order to develop competence.	Training, practice, experience, judgement. Self > team > victim
		1.2	Explain the order of priorities at the scene of an ice rescue.	
2	Training standards	2.1	Recognise the different training courses within the Rescue 3 program.	Describe our various courses and explain where the curriculum comes from (this document!) • Describe what it means to be a Technician/Operator/First Responder etc. • Intro to NFPA Standards - 1670 & 1006 • How we meet and exceed these standards • Introduce the Rescue 3 Standard as a truly international standard.
		2.2	Recall and remit the role of an individual trained to a given level.	
		2.3	State how the Rescue 3 program fits within national and international standards.	
		2.4	State how the Rescue 3 program fits within Agency policy and agency Standard Operating Guidelines.	
3	Rescue 3 best practice guidelines	3.1	Apply the Rescue 3 best practice guidelines to produce safe working practice.	These were formerly called "The Absolutes". (See the manual or presentation for a list.) Teaching Tip: Consider using some video to highlight good and bad examples.
4	Risk management and rescuer safety	4.1	Recall the steps to perform a risk benefit analysis.	Identifying risk - actual vs perceived risk • Greatest risk populations • Reducing risk • Hazard curve paradox • Risk benefit analysis • Rescue vs recovery • General hazards water/ice rescue • Past experience - why have ice rescues fallen apart? • Rehabilitation considerations • Site specific safety considerations • Negligence and best protection
		4.2	Recall measures to minimize risks to both your rescuers and the organization.	
5	Ice properties, formations and types	5.1	Recall the factors that affect ice formation and strength.	• Factors affecting ice formation • River ice vs lake ice • Ice types • Factors affecting ice strength • Ice thickness minimums
		5.2	Recognize the various types of ice and recall their corresponding properties.	

	Skill sheet element		Learning outcome	Key teaching points
6	Ice hazards	6.1	Recognize ice specific hazards that may affect rescuer safety.	• Fluctuating water levels, • Thermal constriction and expansion • Cracking • Radiant heating • Overflow • Dynamic ice • Floating ice • Anchor ice
7	Hydrology	7.1	Identify the effect that volume, gradient and obstacles have on water.	Key idea: Rivers are powerful and relentless but predictable. (See the Powerpoint presentation for a complete outline of the curriculum related to this Standard.) Teaching Tip: Relate how basic river features and hydrology will effect the formation of ice and assist in size up of an operation and risk benefit analysis. Our IRT course covers basic Ice Rescue for frozen bodies of water or mantle based rescue for slow moving rivers. Those individuals or teams who work or respond to large volume or fast rivers with open leads should take our Ice Rescue Technician - Advanced course.
		7.2	Identify water features, hazards and suitable control measures.	
		7.3	Describe the impact these features would have on an individual's ability to self rescue and perform surface Ice Rescue.	
		7.4	Understand the hazards of moving water and the limitations of basic surface ice rescue techniques.	
		7.5	Describe how hydrology will affect the formation of ice.	
8	Personal protective equipment	8.1	Identify PPE and Equipment used for in-water or on ice operations.	Thoroughly outline the pros/cons and differences for survival, dry, and ice rescue suits. • Care and maintenance of PPE • While Mustang Ice Commander Suits are not considered an approved PFD, we do not feel that a PFD needs to be worn on top of it. The suits provide adequate flotation for static surface ice rescue. • During advanced ice rescue operations (moving water) standard swift water PPE should be worn (drysuit, helmet and PFD). • All students need to know how to improvise a chest harness with webbing for ice rescue operations. • All students should also be able to put a chest harness on a subject. Practice on dry land first. Use a double larksfoot with or without a shoulder loop.
		8.2	Select appropriate PPE for a technician, performance checks, donning and buddy checks.	
		8.3	Recall post-use care and inspection procedures.	

	Skill sheet element		Learning outcome	Key teaching points
9	Technical and team equipment	9.1	Select the correct application for technical equipment used in Surface Ice Rescue.	• Why we use non locking wiregate karabiners • How to use two wiregates to create a solid attachment (gates opposite and opposed) • Basics of how to load a karabiner • Rescue pulleys • Webbing • Overview of the properties of polypropylene, Spectra/ Spectrex/ Dyneema, nylon, polyester and hollow core • Ice screws • Ice rescue tether kits - commercial and improvised • Ice rescue reels • Cold water rescue slings • Reach poles • Sleds/boards/boats when appropriate • Go over how to maintain and inspect equipment • Equipment lifecycles
		9.2	Recall post-use care and inspection procedures for technical and team equipment.	
10	Management and pre-planning	10.1	List the four components for a generic pre-plan.	Try to make this as specific to the group and their environment as possible. (See Powerpoint presentations for a more complete overview of this session.)
		10.2	Identify sources of information useful for generic and task location specific pre-planning.	
		10.3	Describe key information that should be included in a pre-plan.	
11	Incident size-up	11.1	List rescue options in order of ascending risk.	• Talk, Reach, Throw, Row, Go, Tow – NO! • This "mantra" should be presented as a tactical toolbox rather than a linear list of options. Choose the lowest risk option with the highest chance of success. Size Up • Facts • Probabilities • Situation • Decision • Plan L.A.S.T. T.E.M.P.O. Note: Conditional rescue refers to rescues that rely on the subject to assist such as reach or throw style rescues. True rescues, such as contact rescues, do not require the assistance of the subject. TIP: Consider showing some video of actual events
		11.2	Explain the difference between true and conditional rescues.	
		11.3	Relative to the remit of a Technician, select an appropriate plan of action for the personnel and subject present.	

	Skill sheet element		Learning outcome	Key teaching points
12	ICS and site control	12.1	Perform a risk assessment of the rescue site.	• I.C.S. • Benefits of I.C.S. • Safety officer roles and responsibilities • Basic structure • Roles • Highlight its ability to adapt to the size of the incident (shrink or grow) • Span of control • Operational zones and site control • Low to high risk rescue options • Communication and common barriers to good communication. • Incident termination
		12.2	Based on hazard recognition, apply appropriate control measures.	
		12.3	Apply different roles that may be allocated at a surface ice incident, including prepositioned personnel.	
		12.4	Collate relevant information in order to deliver structured messages regarding an incident.	
		12.5	Apply a simple structure and centralized command, in order to brief and manage a team.	
13	Communications	13.1	Using hand signals, be able to communicate the following: ok, help, stop, left, right, need medical assistance.	Hand Signals • OK - One hand (open or closed fist) tapping the top of head • Help - One or two hands waving overhead • Stop - Arms out straight making a T, one fist raised or arm outstretched in front with palm forward • Left - Point left • Right - Point right • Need medical assistance - cross arms over the chest. Hand signals should be repeated once to confirm message received. Whistle Signals • Stop/Attention - One blast • Up Stream - Two blasts • Downstream - Three blasts • Emergency - Continuous blasts Local variations may exist. Ensure that you are familiar with all local teams' signals.
		13.2	Using whistle signals, be able to communicate the following: stop, upstream, downstream and emergency.	
		13.3	Identify barriers to communications and limitations of hand and whistle signals.	

	Skill sheet element		Learning outcome	Key teaching points
14	Medical considerations	14.1	Identify the affects of cold water immersion on the body.	• Define cold water as anything less than 21 degrees Celsius. Define cold shock, cold incapacitation, acute hypothermia and circum-rescue collapse. • Cold water gasp reflex, shell to core shunting of blood • Autonomic Conflict • Submersion Injuries and drowning • 1-10-1 rule as it applies to static water ice submersion. • Mild and severe hypothermia • Parbuckling - how and why • Submersion Injury • Resuscitation recommendations • Decontamination procedures as per flood rescue curriculum.
		14.2	Identify signs, symptoms and treatments for mild/severe hypothermia and drowning.	
		14.3	Identify personnel at risk to the previous medical conditions and control measures put in place to minimize this.	
		14.4	Apply techniques that minimize exposure to the water and decontamination procedures post-exposure.	
15	Animal rescue considerations	15.1	Identify hazards and control measures associated with animal rescue	• Go over Best Practice Guidelines for Animal Rescue • Identify the tactical differences between large and small animals. • Introduction to tools that may assist in extrication and transport • Risk Benefit analysis – Why perform animal rescue • Some basics of animal behaviour Note – This is a very common scenario for emergency response teams. Give it an appropriate amount of attention. Use the presentation as a guideline. We also have a few good videos (Calgary and Edmonton AB to use as case studies. Consider a scenario with an animal rescue component.
		15.2	Identify extrication and transport considerations for animal rescue	

	Skill sheet element		Learning outcome	Key teaching points
16	Knots, bends and hitches	16.1	Be able to tie, identify and check the knots that may be required for a surface ice rescue.	• How and why do knots reduce the tensile strength of a rope. • Common terminology Knots • Figure Eight Stopper • Figure Eight Bend • Figure Eight Follow through • Figure Eight on a bight • Directional 8 or Alpine Butterfly • Double overhand Bend (Double Fisherman's) • Overhand Bend in webbing Note: At this point you do not need to have a stopper knot so long as you have a palm's width of tail coming from your knot (Figure 8 family) Hitches • Clove Hitch • Munter Hitch • Prusik Hitch • Klemheist or autoblock - works well in cold conditions when a prusik may fail. Note: If a clove hitch is used as termination knot it should also be backed up with an overhand stopper knot. Note: Consider using Sterling Hollow Block prusik cord as well, as it tends to bight better on the host rope when it is wet or icy. TIP: It is a good idea to build good habits early on. Have your students get used to dressing and setting knots as well.
		16.2	Recall factors affecting know choice for surface ice rescue applications.	

	Skill sheet element		Learning outcome	Key teaching points
17	Anchor systems	17.1	Be able to select an appropriate single anchor point and create an attachment point using rope and webbing.	Ice Screws • How to place them • Tying off short • Estimating strengths Note: Based on our own ice rescue tests we do not need to teach students how to use multiple ice screws and create a load distributing/sharing multi point anchor. One ice screw in white river ice failed between 20-24kN. This is stronger than most rope used in an ice rescue. Given that we are usually pulling PEOPLE over the ice mantle this should be AMPLE strength. Load distributing anchors may be shown as an option for snow machine recovery etc. • Natural anchors • Basket Hitch • Vehicle anchors • Snow machines trucks • Quads
		17.2	How to place and utilize an ice screw as an effective anchor point.	

	Skill sheet element		Learning outcome	Key teaching points
18	Tensioning systems and mechanical advantage	18.1	Identify the need for mechanical advantage systems when tensioning or moving loads.	An emergency response team working on an ice rescue incident will likely have little need for MA on a basic rescue. We can only pull so hard on the person who is in the water before we injure them. For more than one person on a 3:1 you should likely re-think your tactic ... pulling harder may not be the answer. For small teams, rescues far from shore, or field services personnel a simple 2:1 or 3:1 are key skills. Start with a non-ratcheting system. If time and temperature permit add progress capture and haul cams. During a basic ice rescue there will not be constant force on the rope so a progress capture may not even be necessary. For more advanced rescue situations, setting up containment or equipment recovery full ratcheting systems may be required. Consider mechanical rope grabs or webbing friction hitches such as the auto block which may hold better on icy ropes than a traditional prusik. TIP: Using clothes pins to help illustrate the "T" system provides a great visual to the students.
		18.2	Build and check simple 2:1 and 3:1 systems that can be reset and capture progress.	

	Skill sheet element		Learning outcome	Key teaching points
19	Ice testing procedures	19.1	Perform an assessment of the ice to determine its thickness and relative strength.	This is an important skill for advanced ice or difficult access situations. Rescue teams will assume weak ice and should always be prepared for the worst. Those who work on the ice may need to test the ice often to ensure they do not fall through. Keep it Simple - Have one line tender body belay (or just hold the rope) while a second person advances onto the ice. Once off shore the leader should test the ice by placing an ice screw. Type and depth of ice can be determined through feel as the screw moves downward. While this is fairly conservative, 4 inches of clear ice is considered safe ice. Therefore 8 inches of white ice is also safe. Assuming the ice test reveals safe ice. The belayer can then advance across the same path as the leader and reset the belay at the test hole. Repeat as needed. Frequency of test holes will depend on how consistent the data is and what the consequences of falling though are.
		19.2	Perform a basic belay technique and line tend for a lead rescuer who is performing ice testing procedures.	
20	Walking on ice	20.1	Demonstrate weak ice procedures.	Students should be taught to test the ice if they are unsure or unprepared to fall through. At any point if the ice begins to crack or pop the should gently lower their weight until they are crawling or sliding on their belly. Don't run or drop down to the ice. If walking in a group the group should spread out and get low. Getting low not only distributes your weight better but it also decreases the consequences of breaking though. You will be less likely to injure yourself and will likely be able to keep your head above water lessening the cold water gasp reflex. Retreat to safe ice by sliding or crawling back towards the shoreline following the same path you came from.
		20.2	Demonstrate how to retreat back to safe ice.	
		20.3	Demonstrate how to minimize risks associated with walking on ice.	
		20.4	Determine when ice is safe to walk on.	

	Skill sheet element		Learning outcome	Key teaching points
21	Self-rescue techniques	21.1	Demonstrate the ability to self rescue from a fall through the ice into water.	This should be a slow progression. Some people will be terrified to get in for the first time. Ideally try this first with a good ice mantle. Do a demo so the students can SEE what good technique looks like. For the first evolution try without ice picks. Good technique looks like this: • Get as much of your upper body on the ice as possible. • Get your elbows out in front of your body and put your head down on your arms or the ice. • Kick your feet • Start to crawl "army style" with your arms while keeping your head down and kicking • Get a knee up on the ice • Continue to belly slide/crawl or roll away from the weak ice. Students will have the tendency to try to use strength and get out the same way they would in a pool. Often this will work during courses if we have a solid ice mantle. Remind them that if they fell through for REAL they would likely have a weaker mantle. Try the same process again with ice picks. You will notice that some students who got out without picks CAN'T get out with picks. If this is the case it is likely because they are no longer using good technique and are trying to muscle out!

	Skill sheet element		Learning outcome	Key teaching points
22	Conditional rescues	22.1	Identify rescue options and the limitations of conditional rescues.	They must first evaluate the subject's condition to determine which tactic to employ. If the subject is NOT wearing a PFD the first step will be to get them something that floats. This can be thrown or pushed to them. Remember this course is SURFACE water rescue….. not dive rescue. If they have flotation on and are not in a moving water environment there is no need to rush. Take the time to get things organized before proceeding. Emphasize the importance of good coaching. If we can talk them through a self rescue that is likely the best bet. For a reach rescue to work the subject still needs to have a decent amount of strength. Try to pick a system where by the subject does not rely on grip strength alone. Throw rescues are often more practical because you can often reach the subject at a further distance and they can wrap the rope around their arms to minimize the need for grip strength. IT IS OK to ask the subject to "wrap" the rope around their arm a number of times. Throwing or pushing out a rescue sling would be ideal as it can be placed around their body AND if floats. Teach standard underarm throws and basic coiling techniques. TIP: When possible set up multiple stations. Keep people moving. You will have a limited amount of time to keep people engaged in the cold.
		22.2	Identify, check and prepare suitable equipment for performing a conditional rescue.	
		22.3	Perform conditional rescues in a variety of locations including talk reach and throw.	
		22.4	Assess subject and environment in order to perform conditional rescues.	

	Skill sheet element		Learning outcome	Key teaching points
23	True rescues (contact rescues)	23.1	Demonstrate the ability to don an improvised chest harness.	Contact rescues will be required for unresponsive casualties or those who do not possess the strength to hold onto a rope. A good chest harness for ice rescue will have an attachment point high on the sternum. Often times the quick release belt on a Type V PFD sits too low. A harness that is too low will only pull the subject into the ice … not on top of it. Key Points • Show them how to improvise a tether system with a throw rope and how to connect to the system. • Talk them through good line tending • Pick an appropriate line of approach that will not break the ice in front of the subject. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. • Don't forget about the casualties body position • Ideally the rescuer will not get into the water but they may need to if the subject cannot assist in getting their body into a good position. TIP: Ideally you should set up multiple stations to keep people moving and warm. Have students who are not participating practice something else. Anchors, throw bags etc. Keep 'em moving!
		23.2	Demonstrate the ability to connect to the integrated harness on an ice rescue suit.	
		23.3	Determine a safe and appropriate line of approach to the subject.	
		23.4	Demonstrate the ability to secure the subject to the rope system with commercially available systems and improvised techniques.	
		23.5	Demonstrate accurate rope management that ensures the rescuer is not impeded and the belay is robust enough to handle the load.	
		23.6	Demonstrate the ability to extricate the subject from the water onto the ice mantle.	
		23.7	Demonstrate the ability to construct a simple mechanical advantage system.	
		23.8	Demonstrate the ability to perform an off ice mantle rescue to a floating subject in non-moving water.	

	Skill sheet element		Learning outcome	Key teaching points
24	Rescue craft	24.1	Recognize the basic features, care and matinee of a given rescue craft.	Ideally students will have an opportunity to try both a board and a sled. Let them choose which one makes the most sense for their environment. Boats Oceanid's Rapid Deployment Craft (RDC) is the craft of choice for most teams. However you should do some research ahead of time to know what the team is using and prepare accordingly. Note: It is our opinion that rescuers should NOT be tethered into the boat. This provides unnecessary complexity. Key Points • Show them how to use a commercial tether system and improvise a tether system with a throw rope and how to connect to the boat. • Teach them to work from within the boat or at least in contact with the boat at all times. • Talk them through good line tending • Approach the subject head on and stop before they push them off the ice. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. Teach them how to lift the subject into the boat.
		24.2	Demonstrate the ability to prepare the craft for use.	
		24.3	Demonstrate the ability to efficiently move the craft over the ice.	
		24.4	Demonstrate how to efficiently and safely utilize the craft to assist in the extrication and rescue of a subject who is in the water.	
		24.5	Demonstrate the ability to line tend a rescue craft during a surface ice rescue.	

	Skill sheet element		Learning outcome	Key teaching points
	Rescue craft (continued)			Sleds Rescue boards range in complexity from a basic rescue board to a rescue sled. For the most part it is our opinion that an RDC style craft is a better choice for most teams offering the most security, versatility and least amount of complexity. However a rescue board can also be cheap, simple and do the trick. Sleds are more complex, specialized pieces of equipment and some require adequate training time to be proficient with. Some are so specialized they tend to be "one trick ponies." The advantages of a rescue board or sled are: • When used correctly they make the subject's transition from in the water to on the ice smoother. Patients can also be kept in a more horizontal position which may prove beneficial if they are severely hypothermic. • Sleds have runners which allow them to glide more easily over the ice. This may be ideal if access is over very thin ice with little snow cover (high wind areas with weak ice). However they do not work well in deep snow. • Non-inflatable boards/sleds are immediately deployable.. Key Points • Show them how to use a commercial tether system and improvise a tether system with a throw rope and how to connect to the board. • Teach them how to advance the board to the subject • Talk them through good line tending • Approach the subject head on and stop before they push them off the ice. • Help them through securing the subject. They should work BOTH with a rescue sling and an improvised harness. Teach them how to lift the subject into the boat

	Skill sheet element		Learning outcome	Key teaching points
25	Swimming techniques (swiftwater/ice river)	25.1	Be able to transition between defensive and aggressive swimming positions while in moving water and generate momentum.	It is generally it is a good idea to allow students to get in and out for the first time while on a tether. Assuming your site allows for it, it is ok to progress to an untethered self rescue. Much like swimming into an eddy, the student should push themselves off the ice mantle and swim at it on a 45 degree angle. If they are unable to self rescue they will likely need to push off again, build up some momentum, and try again. Safety Considerations As with all dynamic ice rescue techniques the key lies in selecting a suitable venue. We look for relatively straight section of river where the flow runs parallel to the ice mantle. Additionally the site must allow an adequate amount of downstream space before the flow runs under the ice to ensure solid containment can be provided. Full swiftwater PPE should be worn for dynamic ice rescue training and operations. Ice commander suits were not designed for swift water applications. Consider installing a grab line running parallel to the ice mantle towards the downstream end of the operational zone. This way if people are unable to self rescue they can grab the line and pull themselves out or at least hold them selves there until an Instructor can assist them. Training should not be conducted if there are significant floating ice chunks or frail pans moving through he training area. Also make sure you have an RDC or IK (with throw baggers) available at the downstream end of the operational zone in case someone needs assistance. In some cases a rescue curtain may be feasible and allow for more secure containment. Downstream safety and upstream spotters must be in place during all dynamic ice exercises. It is also best practice for rescue teams to have a rapid intervention team (back up) ready to go in a swiftwater environment in case contact is lost with the subject or the rescuers get into trouble.
		25.2	Adopt a variety of angles to the current vector depending on task.	
		25.3	Apply swimming techniques and angle control in order to increase or decrease momentum, to enable swimmers to cross flows, negotiate obstacles and self rescue.	
		25.4	Demonstrate the ability to self rescue back onto the ice mantle in a moving water environment.	

	Skill sheet element		Learning outcome	Key teaching points
26	Mantle-based conditional rescues (swiftwater/ice river)	26.1	Identify rescue options and the limitations of conditional rescues.	Assuming the site allows it is preferable to have the water bound students NOT on a tether during throw rope practice. The tether line tends to get in the way and adversely affect the exercise. Tactically speaking there are a few differences between static ice rescue, swift water rescue and dynamic ice rescue when it comes to throw bag techniques. When it comes to a risk benefit analysis it often still advisable to have the subject wrap up in the rope in a dynamic ice rescue situation. Once the waterborne subject has grabbed the rope pay careful attention to pull in the slack while avoiding a snag on the ice mantle. If the rope gets caught on the ice mantle and the subject pendulums in below that point they may not be able use the rope to climb over the mantle as it will be parallel to the flow. Additionally there may be enough friction that the line tender may not be able to pull the subject in. The line tender should move to a position perpendicular to the flow and with a straight line between the rescuer and the subject in order for a pull to assist as desired. Reach rescuers work in much the same way but the ice will be increasing weaker towards the open water and with the addition of current this may not be a realistic option.
		26.2	Identify, check and prepare suitable equipment for performing a conditional rescue.	
		26.3	Perform conditional rescues in a variety of locations including talk reach and throw.	
		26.4	Assess subject and environment in order to perform conditional rescues.	
		26.5	Recognize the tactical differences between dynamic and static ice rescue techniques.	

	Skill sheet element		Learning outcome	Key teaching points
27	Mantle-based true rescues (swiftwater/ice river)	27.1	Demonstrate the ability to don an improvised chest harness.	Tactics for contact rescuers in dynamic ice are similar to static water. It is often best for the rescuer to approach from an upstream position of the subject. Once the subject is secured the rescuer may need to move to a downstream position to assist pulling the subject over the ice mantle. Sometimes it may be required for the rescuer to assist by rolling the subject onto the ice while the line tenders pull. Both the rescuer and the subject should stay low as they retreat to safe ice.
		27.2	Demonstrate the ability to connect to the integrated harness on an ice rescue suit.	
		27.3	Determine a safe and appropriate line of approach to the subject.	
		27.4	Demonstrate the ability to secure the subject to the rope system with commercially available and improvised techniques.	
		27.5	Demonstrate accurate rope management that ensures the rescuer is not impeded and the belay is robust enough to handle the load.	
		27.6	Demonstrate the ability to extricate the subject from the water onto the ice mantle.	
		27.7	Recognize the tactical differences between dynamic and static ice rescue techniques.	

	Skill sheet element		Learning outcome	Key teaching points
28	Mantle-based craft rescues (swiftwater/ice river)	28.1	Recognize the basic features, care and matinee of a given rescue craft.	Tactics for a rescue craft may need to be altered depending on which type of craft is being used. RDC tactics: Attach an outhaul tether the stern of the RDC and have line tenders manage the rope. Ensure two paddles are in the boat. Have two rescuers advance the boat to the ice mantle by walking from within the boat. Rescuers should NOT be tethered to the boat (although this is practiced by some agencies). If this is done they should be attached via a quick release belt. Once close to the mantle have the bow rescuer lie in the boat and prepare to make contact with the subject through the bow opening. A cold water rescue sling should be applied to the subject ASAP. It may be necessary for the stern rescuer to angle the stern of the boat upstream to assist the bow rescuer when attempting to pull the subject in the boat. The line tenders will need to adapt accordingly. The decision to leave the ice mantle should be pre-planned and discussed prior to attempting rescue. If the decision is made to leave the ice mantle because contact has been lost with the subject the RDC will need to be disconnected from tether if the rescuers hope to have any control of the boat. Rescue board tactics: Tactics for use of a rescue board are much the same in swift water as they are in static water. Generally it is best for the rescuer to approach slightly upstream of the subject. The board can then be advanced between the rescuer and the subject. As always is advisable to secure the subject to a tether system BEFORE you try to get them on the board. Otherwise if you lose contact with them they will float downstream and the rescue will need to be attempted again.
		28.2	Demonstrate the ability to prepare the craft for use.	
		28.3	Demonstrate the ability to efficiently move the craft over the ice.	
		28.4	Demonstrate how to efficiently and safely utilize the craft to assist in the extrication and rescue of a subject who is in the water.	
		28.5	Demonstrate the ability to line tend a rescue board during a surface ice rescue.	
		28.6	Recognize the tactical differences between dynamic and static ice rescue techniques.	

	Skill sheet element		Learning outcome	Key teaching points
29	Off-mantle rescuer-based rescues (swiftwater/ice river)	29.1	Perform a risk benefit analysis to determine whether or not off-mantle ice rescue tactics are feasible.	Off mantle dynamic ice rescues are very high risk options. Unless bombproof containment can be provided, this is not a viable option for most teams and most scenarios. A thorough risk benefit analysis should be conducted and all off mantle rescues should be pre-planned and trained for. Full swiftwater PPE must be worn. In water contact rescuers should not be performed if floating ice pans are present or if there is not a suitable distance before closed leads. A progression from contact rescue with a thrown rope to retrieve the rescuer to live bait (tethered) strategies are much the same as they would be for a typical swift water rescue. However there are a few additional considerations. The rescuers should be tethered to his quick release belt not a fixed chest harness. Line tenders must take care to ensure the rope does not get snagged on the ice mantle A second tethered rescuer may be required and should be in place to assist in getting the subject onto the ice mantle. This rescuer will stay on top of the ice mantle. They may use an RDC or SLED to assist as normal. The primary function of the waterbound tethered rescuer is to get the subject to the ice mantle.
		29.2	Demonstrate the ability to safely and efficiently perform an off-mantle contact rescue and gain control of a floating subject and bring them back to the ice mantle.	
		29.3	Function as a line tender during an off-mantle dynamic ice rescue.	

	Skill sheet element		Learning outcome	Key teaching points
30	Off-mantle craft-based rescues (swiftwater/ice river)	30.1	Perform a risk benefit analysis to determine whether or not off mantle ice rescue tactics are feasible.	While an RDC or other IRBs do increase the safety margin during in water ice rescue operations they do add complexity and are still considered a very high risk option. Solid boat (paddling skills) are required prior to training in a dynamic ice environment. Self rescue techniques should be covered as a first priority. Pick offs are taught the same way as they would be in a typical swift water course. Rescuers should NOT be tethered to the RDC Dedicate an appropriate amount of time to getting on and off the ice mantle before allowing students to do it with a subject on board. Have a tethered rescue team downstream to assist with the transition onto the ice mantle if required.
		30.2	Demonstrate the ability to disconnect from the tether system and manoeuvre the craft to pick up the subject.	
		30.3	Demonstrate the ability to manoeuvre the craft back onto the ice mantle.	
		30.4	Function as a line tender during an off mantle dynamic ice rescue.	
31	Downstream containment strategies	31.1	Recognize the need for downstream containment and identify the associated risks.	• Risk-benefit analysis - site assessments Live bait rescue options Rescue curtain Boat-based containment strategies
		31.2	Demonstrate the ability provide effective downstream containment during dynamic ice rescue operations.	
32	Scenarios	32.1	Complete an ice rescue scenario	Ice rescue scenarios

	Skill sheet element		Learning outcome	Key teaching points
33	Inflated fire hose (if applicable to agency)	33.1	Students should be able to inflate and deflate a section of hose, and identify the hazards of working with compressed air	• When the hose is filled with air it floats and remains rigid enough to be passed to a subject or across a stream. If can be used as a reach device during ice rescues. • If you fold the end of the hose over a few feet and tie it with webbing before inflating it will create a loop. • User can also slide back to safe ice while remaining on top of the hose to help distribute their weight. This may allow the rescuer to access or egress over weak ice as well. eg Mark V Hose Inflation System sold by Rescue Source (RQ3). The Mark V Kit includes: • 2 1/2" NH Standard female aluminium hose cap with tie down for securing safety lines. • 2 1/2" NH Standard male aluminium hose cap with standard quick disconnect to attach filler hose. There is also a tie down on this end for securing a safety line. • Pressure relief valve set at 35-40lbs. for safety. • Shield to protect fittings. • SCBA high pressure valve and wheel with hose so you can fill from your own high pressure SCBA bottles.
		33.2	Perform reach rescues with a fire hose in a flat water environment, identifying the limitations.	

	Skill sheet element		Learning outcome	Key teaching points
34	Ladder rescue techniques (if applicable to agency)	34.1	Perform reach rescues with a fire hose in a flat water environment, identifying the limitations and hazards.	"Tilt" technique: • Uses the leverage created by the ladder to help bring the subject horizontal. The ladder will also glide nicely on ice making the transition onto the mantle much easier on both the rescuers and the subject. For this technique to work well, you need a fairly solid ice mantle and a subject who can assist somewhat by hanging onto the ladder. • Advance the ladder until the subject can just reach and grab it. Slowly raise the rescuer end, letting the other end drop below the water's surface about 3'. • Ask them to pull themselves onto the ladder and get a good grip. • Lower the rescuer end of the ladder back down to horizontal which raises the subject out of the water • Slowly pull the ladder (and the subject) onto the ice.

	Skill sheet element		Learning outcome	Key teaching points
35	Co-worker rescue (one person rescue techniques) (if applicable to agency)	35.1	Perform a risk benefit analysis to determine which ice rescue tactics are feasible.	Often field service personnel work in teams of two. If one person falls through the ice, it will be up to the other to affect the rescue. This may be as easy as throwing a rope or talking the subject out of the water. However a need exists to train for the worst case scenario … a subject who is not able to assist in their own extrication. To do this in a protected fashion the rescuer should: First establish an anchor Connect a rope and rope grab to the rope so they can walk/ crawl out to the subject. The rope grab should be connected to their harness (improvised chest harness or ice rescue suit). Once contact has been made with the subject they can be secured to the end (or any point in the rope via a butterfly knot) of the rope via a cold water rescue sling, webbing harness or into the rope itself. The rescuer can then retreat back to safe ice and pull the subject out. If the rescuer is unable to pull the subject out a mechanical advantage system will need to be integrated. There are many different ways to accomplish this. Choose a way that is as simple as possible using readily available equipment.
		35.2	Demonstrate the ability to set up a rescue system that allows the rescuer to access and secure a waterborne subject.	
		35.3	Demonstrate the ability to extricate the subject from the water and back to safe ice with only one rescuer.	
		35.4	Demonstrate the ability to construct and utilize a simple mechanical advantage system.	
36	Rope assisted self-rescue/ belay techniques (if applicable to agency)	36.1	Perform a risk benefit analysis to determine when a rope assisted self belay should be utilized.	The intention of this is to give students a means to access unknown or weak ice with the support of a rope system designed to assist them in their rescue should they fall through the ice. One approach would be a 2:1 self belay system.
		36.2	Set up a rope system which allows the worker to access weak ice and will assist in self rescue should it be required.	
		36.3	Demonstrate the ability to self rescue given a rope system with mechanical advantage.	

	Skill sheet element		Learning outcome	Key teaching points
37	Equipment recovery strategies (if applicable to agency)	37.1	Perform a risk benefit analysis to determine if equipment recovery is feasible.	This standard primarily exists for field service personnel but it may be useful for some rescue teams as well. The intent is to provide some tools for retrieving equipment such as a snow machine that has broken through the ice but has not sunk under the surface of the water. If a snow machine was to partially break through the ice the first step would be to try to pull it out with a standard ice anchor and MA system. If this cannot be achieved the next step may be to try and elevate as much of the machine out of the water as possible so that it does not freeze in that position. This can be accomplished by improvising a tripod to create an artificial high directional. Supports for the feet of the tripod should be fabricated from plywood or other improvised material to distribute the weight as to ensure it does not break through the ice. Once the machine is lifted high enough it can be pulled onto stable ice. If this cannot be accomplished then spruce boughs or other material can be packed under the machine to help increase its footprint and prevent it from freezing into the ice while additional help arrives.
		37.2	Recall the considerations for use of a tripod or artificial high directional to assist with extrication.	
		37.3	Demonstrate the ability to construct a simple mechanical advantage rope system to assist in extricating equipment from below the ice.	

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