Clothing represents

- A performance limiter or enhancer
- Dress for the current and prepare for the worst
- Protection from cold, heat, prickers, ticks, and the sun
- A significant investment on the part of the SAR member

Clothing is merely shelter that you carry on or with you and needs to be suitable for the elements to be sheltered against

- Heat
- Cold
- Wind
- Moisture

In the Field

- Appropriate Protection
- Durable
- Functional
- Versatile

US Navy SERE School
Cold wet day

Protects from heat transfer

Protects from physical hazards

Because SAR activities often happen in less than desirable weather conditions and less than ideal ground conditions, search operations are not the place for a fashion statement. It is also not the best arena for “minimalist” clothing.

To be functional, clothing must be comfortable and able to withstand the abuse of rock friction, prodding branches, and sticky brambles. While high tech clothing lends many performance merits to the SAR clothing equation, a thicket of thorny growth can make mince-meat of a $300 ultra-lite parka really fast.

Because you are limited in how much you can carry as a practical matter, what you pick also has to be versatile. Mixing and matching for the conditions lets you handle a broad spectrum of conditions with minimum compromise to the body. Layering is usually the answer to most outdoor attire on a search.

Clothing as a System

- Wicking
- Insulation
- Breathability
- Vapor-passing
- Wind proofing
- Waterproofing
- Fit

No system works if it doesn't work for YOU. There are many folks who swear exclusively by coated rainwear and as many who swear by waterproof/breathable outerwear. Often it has to do with the cut and the interaction of particular pieces of clothing as well as how you work, perspire, heat, and chill.

All the points you see on the slide enter into the equation. However, to benefit the most from any outdoor clothing system you need to think in layers. The basic idea is presented in the picture with the outer layer protecting from wind, rain, and snow while resisting damage, the middle layer (could be one or more pieces of clothing) providing that dead air space to keep you warm, and the inner layer providing comfort and also wicking moisture away from your body.

Clothing keeps you warm because it allows your skin to heat the air between it and your clothing AND prevents that warmth from leaking out into the air. The extent to which the clothing either prevents heat loss or encourages it determines the effectiveness of "insulation." Having several layers allows you to adjust for changes in this factor much more precisely.

Hot Weather

- Sun
- Insects
- Injury
- Promote Evaporation

Breathability

Loose Fit (watch chaffing)

Durability

In warm weather your clothing needs to protect you from sun and insects, permit adequate cooling, and protect you from brambles and brush. It is true that light colored clothing stays generally cooler and sun penetration is affected by the tightness or looseness of the weave. Skin covered with clothing is less subject to injury from branches and insects.

It is very critical that the clothing used enhances evaporation of sweat. Sweating is your body's heat-control mechanism and the faster sweat can be moved away the better the heat control.

It's also important to consider chaffing. The thighs and groin are the most common areas. Inadequate moisture transport, inappropriate clothing construction (seams inside jeans for example), and poor fitting clothes are all heavily contributing factors.

Especially for insect and injury protection, SAR members usually wear long pants and long sleeves even during warm weather and frequently treat the clothing with chemicals such as Permethrin to repel ticks and other insects.

Layering is the key for winter

- Low temperatures
- Wind
- Cold Surfaces
- Wet
- Sun

In cold weather the importance of layers cannot be overemphasized.
Yes, many of the layers will consist of items with more insulating capacity, but there will be a wide disparity between clothing needed on a sunny climb and that needed during a shady lunch rest.

Moisture is a very serious enemy in winter conditions. While cold and dry is usually a manageable condition, cold and wet can be fatal. Clothing loses a good deal of its insulating ability when wet. Moisture promotes heat loss since water is such an effective conductor of heat. As you are developing your layered approach think about not getting wet from sweat or the weather while searching.

Water management is not only drinking enough, it is managing your layers of clothes to match the exertion needed and the weather conditions so you don't soak your clothes from the inside out. Having layers to add from your ready pack and room to put layers away as you need to shed them is critical.

And, don't forget keeping your hands warm! Mittens work better than gloves but a good heavy pair of mittens may make it hard to use some of your gear so wear a pair of liners (a light usually wicking glove) underneath so if you need to take your mitten off your skin is not exposed directly to the elements.

When you are dressing for a cold weather search think about layers so that if you get too warm you can peel a little off and vice versa. Here are some examples of ways to layer:

TOP ROW left to right: synthetic long underwear, light wool shirt, insulating vest, wool sweater, wind/rain jacket

MIDDLE ROW left to right: wool pants, wind/rain pants, wool socks, glove liners, heavy mittens

BOTTOM ROW left to right: light polypropylene hat, heavy wool balaclava.

This is just an example of how you might layer depending on the weather, the amount of exercise you will be doing and if you need to stop. Notice that wool is emphasized here; that is because it will keep you warm even if it's wet.

Inner Base Layer

Comfortable and wicks moisture away from skin

Wool socks

Light liner gloves

Top and bottom base layer

Synthetic materials and wool work best

For this layer you need a thin material that “wicks” moisture away from your skin so that it can evaporate. The material that the garment is made from is very important. Polypropylene and wool are perhaps the most common and effective.

Cotton should never be worn next to the skin as it absorbs moisture rather than wicks it away from the body.

Even when using appropriate materials for the base layer there are times when it may not be able to keep up with moisture transfer and become wet. This is fairly common when hiking up steep terrain, especially on your back where the pack inhibits breathability. Many experienced SAR members carry a spare dry base layer shirt with them to change into.

Insulating Layer

Wool pants, shirt, and socks
Fleece/wool/down vest or sweater

Your insulating layer should consist of several thin layers. Having several thin layers allows you to peel off or add on layers as you need them.

Think of it as a volume control. You should be able to stack your layers together to form a thicker layer. You may want to purchase your insulating layers in various sizes. Remember that it is the trapped air that is doing the insulating, and if you compress it you defeat the purpose of adding layers.

Cotton is an excellent insulator but ONLY IF IT REMAINS DRY. Goose down is one of the best insulators known to man, ONLY IF IT REMAINS DRY. Get a down jacket wet and what you have left is a bag of wet feathers that is almost impossible to field dry and has zero insulating value.

Outer & Visibility Layers

Waterproof/breathable

The outer layer article is generally made from one of the following: un-coated nylon, coated nylon or one of the waterproof and breathable fabrics such as Gore-Tex. The purpose of the outer shell is to keep the inner layers dry and to prevent heat loss through convection. Heat loss through convection is caused when the layer of warm air surrounding your body is stripped away by wind.

The visibility layer is critical during hunting season plus makes it easier for other searchers and aircraft to see you during a search.

C.O.L.D.

- Clean
  - critical for breathable/waterproof garments
- Overlapping layers avoid overheating
- Layers
  - enables easy adjustment - Heat Regulation!
  - provides more effective insulation
- Dry
  - inner clothing must wick
  - outer clothing must prevent entry of moisture

The acronym COLD explains the critical conditions needed for effective cold-weather clothing.

Q. Why do you think cleanliness makes a difference for breathable/waterproof garments?

A. Breathable clothes permit water vapor to pass through them and if clogged with dirt the vapor will be blocked and not pass through.

Overlapping is like weather stripping around windows and doors.

Q. What is a very commonly used protection between feet and legs? How about the neck?

A. Gaiters are used to overlap the feet and legs and a scarf or neck warmer can help keep the cold away from your neck.

Regardless of fabric, it is critical that the construction of outer garments and insulating layers allows easy venting. This may mean pit or side zips and may include easy to grasp zipper pulls in winter.

Wet Weather

Winter conditions = moisture

- Protection from rain
- Protection from surface moisture
- Protection from condensation on inner clothing surfaces

Waterproof breathable materials such as Gore-Tex© are designed for this purpose.

Winter in the northeast presents real challenges to staying dry as the entire landscape is usually covered with snow or ice. Sitting down is likely to not only cause conductive heat losses, but to get you wet as well. Snow and ice present the very real chance of moisture problems on a wide scale. Rain is as much an issue as snow in winter and can be more dangerous. Clothing can soak through faster with rain than with snow, which oftentimes can be brushed or shaken off.

Fit is more critical in winter clothing. Layers must fit closer to allow air-space heating between layers but not so tight as to compress the insulation.

As mentioned earlier, sweating in the winter can get your clothes wet and cause them to lose their insulating ability, sometimes creating a survival situation for the searcher.

Common Usable Materials

- Wool
- Polypropylene
- Acrylics & polyesters
- Nylons
- Waterproof/breathable fabrics

Wool is very durable in a wilderness environment. It breathes well and a tight weave can be resistant to wind penetration. Wool still insulates when wet so it is clearly a case of the old adage “warm and wet”. Some blends are more “scratchy” than others. Products made of soft Merino wool are very comfortable and functional.

Polypropylene is basically plastic. Its big advantage is that it absorbs very little moisture…this makes it an excellent wicking layer to move wetness away from the skin. Polypro has some disadvantages. Some people find it somewhat scratchy, it tends to really hold body odors (but is easy to rinse and dry in the field), and you need to be careful around flames and sparks (it doesn’t flare up, it melts… to your skin).

Acrylics and polyesters can be woven or piled. As insulators they are superior and absorb almost no moisture. Poly tends to be “warm and dry” fabric. It is also heat sensitive and is not as durable as nylon or wool.

Nylon tends to be used as an outer shell garment as it has low moisture absorption, is highly wind resistant and very durable. Outer garments made of waterproof/breathable fabrics provide both protection from the weather and wicking properties to dispel moisture from the inside.

Using different materials in your layering will probably provide you the best protection.

Cotton is a very comfortable and durable fabric for every day use. It's unfortunate because a lot of us have a lot of cotton. Cotton may be OK in the summer when there is good weather and low elevation. However, in cool and cold weather cotton is a killer in the woods.

Most jeans, tee shirts, and white socks are made of cotton and should not generally be part of your SAR gear. Jeans should NEVER be worn on a SAR mission, as they not only get very wet and heavy, but tend to chafe badly and be very uncomfortable when hiking.

More Cautions

Down

- Conducts cold when wet
- Very difficult to dry in the field
- Easily lost when shell is damaged (But excellent insulator for the weight if kept dry!)

Down is by far the most effective, compressible, durable, and light-weight insulator even in this day of highly effective synthetics. Many synthetic insulations come close to down in one or two aspects, a very few are close in all aspects. That is what makes down so appealing.

For all its desirable traits, down presents some very serious challenges. Cost aside, down fill is easy to lose when garments are torn in the woods, is virtually useless once wet, and impossible to dry in the field during a search. It may be OK to use in very cold and dry conditions but less so when there is a chance it may get wet.

Winter Searches

Winter SAR operations require all participants to be properly equipped with winter gear and your veteran team members will be a good source of information about which equipment is the most effective. In winter, plastic double boots with crampons may be the best option for those working in the mountains. There are many leather/rubber combination boot options that have a waterproof membrane, insulation that stays dry and are not too bulky. These can be combined with over-boots for serious winter conditions. If you plan to use crampons you might also want to consider gaiters with heavier 'cordura' type fabric since these will withstand more crampon damage. Most of the terrain in Vermont can be safely searched using Microspikes or equivalent, rather than full crampons.

And for the Odd Parts

- Socks
- Boots
- Gaiters

Tread in good condition

Socks and boots are frequently a unit. Boots work well with some socks and not so well with others, even on the same feet. Generally, socks for SAR are socks for hiking/snowshoeing. They will NOT be cotton and may consist of a layer of light polypro socks with a pair of wool socks over them. This combination provides wicking of moisture away from your feet, warmth and cushioning for your feet. Most experienced outdoors people will wear wool socks even in the summer.

Generally, hiking boots are the most suitable boots for SAR and will work in 3 season operations. **It is most critical that SAR footwear be completely broken in, have good soles for traction, fit comfortably and be sturdily made.** It is important to understand that whether you like a Vibram sole or something else, your boot must have good gripping traction. Whether made of leather and/or fabric; all boots need care after each search. For example, clean, treat and protect your boots, dry the inner sole if you have one and check the laces for damage. Because of the uneven ground underfoot it is recommended that only boots providing direct ankle support be used for SAR. Some hiking shoes provide some ankle stability with a well structured foot-bed, but this is generally inadequate for off-trail use. Hiking boots will serve you better and if cared for will last you for years.

Gaiters in warm weather are designed to keep small debris out of your boots and ticks from getting to your legs. Both can be a particular problem off-trail. They will also serve to repel rain so water doesn't run down into your boots. During storms the pant legs should be put OVER the gaiter tops so that gravity carries the water down the outside of the gaiter onto the outside of the boot. In winter higher gaiters are used to provide protection in snow. High gaiter top sections should be either uncoated nylon or breathable/waterproof material.

Head protection in warmer weather helps with ticks and sun and should provide shade for your eyes, ears and maybe even your neck. In colder weather it helps keep in heat. Watch style caps fit under helmets. Balaclavas cover the entire head and much of the face. In fierce weather wind-proof headgear may be the order of the day. The combination of a balaclava and cap is like a “layering” system for the head. Many people also use neck-warmers or scarves to help with the neck, ears, etc. as needed when resting or in very exposed conditions.

You want to always remember that your hands touch a lot of things during cool and cold weather many of which will carry away heat. It is a very good idea to use a coverage system that employs a “skin” layer using a thin inner glove that provides you enough dexterity to do any work with them and can be left on all the time. Add insulated gloves and or mittens and over-mitts and you’ve got a good combination going.

Oftentimes cold weather articles are on and off a lot. Many folks carry the head/hand items in an easy-to-reach pouch outside their packs or in a jacket pocket.

Good SAR team members learn to embrace the saying:
‘There is no such thing as bad weather – just bad clothing!’

Personal Protection Equipment

Personal Protection Equipment (PPE) is just as important as your clothes

Beyond all your actual clothes always carry PPE.

If you have to render first aid to someone it is important to wear gloves to protect yourself from bodily fluids that might be present (blood, vomit, etc.). Safety glasses when searching can keep branches from poking you in the eye. A pair of light work gloves can also protect you from branches or rocks. Ear plugs are essential if you end up working around a helicopter.

You and your team will follow guidelines from the Vermont Dept of Health during times when a coordinated response requires widespread use of PPE in order to prevent virus or other contagious disease transmission.

Congratulations, you have finished this module

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