Deploying to a cold-wet environment for a disaster or a search and rescue operation can be miserable. When I was 11 years old, I wanted to spend more time in the outdoors, and joining a Boy Scout troop seemed a good way to do so. But after a winter camping trip for which the Scouts certainly didn’t live up to their motto of “be prepared,” I quit the Scouts and joined a mountaineering club. Thereafter, my winter trips were, if not entirely comfortable, at least not as freezeingly miserable as that first Scout campout.

As with any hazardous environment, a cold-wet environment requires proper PPE (government-speak for \textit{Personal Protective Equipment}). If you are being issued military gear suitable for cold-wet environment, all is well and good. But if you have to provide your own PPE, you need to know what to bring. And how to get the PPE you need without spending an arm and two legs. The main danger is hypothermia. For a brief two-page introduction, see \url{conovers.org/ftp/Hypothermia.pdf}.

Good clothing and equipment can be expensive. If you have to buy it yourself, think of it as a donation to the cause of disaster response. But there are ways to save lots of money and still have appropriate gear. REI (Recreational Equipment Inc., also known as “the co-op”) carries reasonably-priced new gear, and often has sales. A place to sometimes get even better deals is \url{sierratradingpost.com}, which often has last years’ clothing and gear at a steep discount. But sometimes you can find usable stuff at your local Goodwill store.

Disclosure: other than having paid $20 back in ~1969 to become a member of the REI co-op (\url{www.rei.com}), which I also heartily recommend to you, I have no financial or other connections to any of the gear I recommend here. Really.

Binghamton, NY). In some disasters, even finding a place to throw a sleeping bag inside without a roof leaking rain on you is nearly impossible (that happened to me after Hurricane Gustav). Unless you’re sure you’ll have space in a DMAT or similar tent, you should probably carry a lightweight tent or bivouac sac. You will need a sleeping bag and pad as well.

You may have realized that we are talking about backpacking gear. And indeed, after a disaster, even an urban area can turn into a wilderness. So learn from those who frequent the wilderness and enjoy it.

Disaster or search and rescue teams sometimes provide lightweight backpacking tents or heavier but bigger Western Shelter or similar tents for shelter, and tend to get ones that do not require guy lines and stakes. Such freestanding tents may be set up on an asphalt or concrete parking lot, and I’ve even seen groups of them set up inside a large warehouse to provide some darkness and privacy for sleep. If you might respond without such group tents, a 1-person \textit{REI Quarter Dome 1 tent} (\url{rei.com} – great place to get lightweight gear, and recommended as a source) sells for $220 and weighs only 2 lbs. 10 oz. A 3-person version costs $380 and weighs 4 lbs. 3 oz.

An alternative to a tent is a “jungle” hammock. It can’t be set up on a bare floor, but it can be strung...
between two trees or similar objects, and keeps you up off the ground (useful when it’s wet, muddy, or there are fire ants). During the hurricane Katrina response, I used my Hennessey Hammock every night; at one point, it was strung up between a couple of pillars on an abandoned hospital. The Hennessey Hammock Expedition Asym Zip Hammock costs $180 and weighs 2 lbs. 13 oz; there are lighter and smaller-packing but more expensive versions.

A quick-and-dirty shelter is a waterproof sleeping bag cover; in North America this is called a bivouac sac or bivvy bag. In Europe, a bivouac sac (more commonly known as a bothy bag) is a floorless, poleless and stakeless tent that you throw over several people for temporary shelter from wind and rain. Some American sleeping-bag cover bivvy bags get fancy, with mosquito netting and small poles to hold the top off your head, but with corresponding increased weight and expense.

The best cheap sleeping bag cover is the SOL Escape Bivy; this $50 sleeping bag cover is waterproof, breathable, very light (8.1 ounces) and reasonably sturdy. If you think it’s likely that you’ll be in a building or Western Shelter tent, this is a good item to carry “just in case.” Even in a tent or building, if you put it around your sleeping bag, you’ll sleep about 10 degrees warmer than your sleeping bag rating, and you don’t have to worry as much about drips from a leaking tent or building roof. Available at REI, in-store or online. Recommended.

Many experienced backpackers tell people to spend more on their sleeping pad than on their sleeping bag. A sleeping bag gets squished underneath you, and when it’s squished, it doesn’t insulate. Even if you can sleep on an Army cot in an insulated Western Shelter tent, your butt will freeze unless you have a sleeping pad on top of that Army cot.

You can get a blue closed-cell foam pad from REI for $20 (you can often find them at Walmart or Kmart, too.) They’re fairly warm (R=1.4). They’re fairly light (10 oz), but they’re quite bulky. And they’re not all that comfortable. A step up is a Therm-a-Rest Zrest pad, which is lighter, less bulky, and more comfortable at R=2.6, 14 ounces and $45.

Or, you can spend $200 on a Therm-a-Rest NeoAir XTherm Sleeping Pad mattress, which is warmer (R=5.7! toasty), weighs a tad more (15 oz for a medium), bulks about a tenth, and at least to me, is about as comfortable as my mattress at home. There are a great variety of choices in between.

Even in the winter, I use my hammock, with a winter sleeping bag and an XTherm pad one size larger than my usual medium size; this prevents the hammock from compressing the sleeping bag around my shoulders.

For a disaster sleeping bag, you probably want a mummy bag of artificial fiber: it’s not as affected by water as much as down. You should get a three-season bag rated to around freezing (32°F), as you can always make it warmer with a liner inside it or a sleeping bag cover or even a blanket over it. Such a bag costs less than a hundred dollars.

Experienced backpackers and climbers probably have a down bag with a GoreTex or similar exterior, which is half the weight and half the bulk, and three times the cost, but they also use it all the time and know how to take care of it. Only get a down bag if you’re willing to baby it.

Shelter includes clothing, particularly for cold and wet environments. You need to know the principles of clothing selection for such environments, starting with the three Ws.

- **Waterproof**: if you’re going to have to go out in the rain, you need good raingear: GoreTex or other waterproof-breathable material. You need both a jacket and pants.
- **Windproof**: if your waterproof-breathable parka doesn’t have pit zips (underarm zippers) for ventilation, and you sweat at all, then you might want to have a separate non-waterproof wind shell. They are very light and some are suitable for mild to moderate rain. A used nylon jacket with a hood can usually be found at Goodwill and costs almost nothing.
- **Warm When Wet**: mountain rescue people have a saying that “cotton kills.” Cotton blue jeans and flannel shirts are warm and comfy when dry, but
but soak up cold water like a sponge and hold it against your skin, losing all insulation value. Standard DMAT uniforms are either cotton or cotton/polyester, and not suitable for cold-wet conditions. You need clothes – both tops and bottoms – that retain their warmth when wet. Long (and short) underwear such as Capilene (a brand name of Patagonia, a highly- reputable outdoor clothing company) not only retain most of their warmth when wet, but wick sweat – so that your sweat rapidly spreads and dries – are quick drying (you can wash, wring out, put on, and let it dry on you if necessary), and are treated to retard bacterial growth. That last means that, even after several days without a shower, you don’t smell nearly as bad. Wool and polyester fleece have similar qualities.

Any time you deploy to a potentially cool or cold environment, bring a week’s worth of wicking, quick-drying underpants (quick-drying bacteriostatic briefs are appropriate in summer, too), and either wool or fleece tops and pants. Consider “soft-shell” pants which have a tough outer surface and a soft, wicking, warm-when-wet lining, and like the underwear mentioned above, may be washed, wrung out, and put back on to dry. I can’t say you will enjoy it, just that you can do it; it’s only a quarter as miserable as wearing wet cotton, and dries maybe ten times as fast. Leaving it hanging overnight to dry is better. Some warm-when-wet shirts, a couple of wool or fleece sweaters, and hat and gloves or mittens, completes your cool-weather wardrobe.

A few other thoughts about clothing for disaster and search and rescue response:

- Dressing for disaster response is harder than dressing for the city or winter hiking.
- In the city, you just put on a single thick coat when you go outside, and don’t worry about your legs; after all, you won’t be outside for very long.
- On a winter hike, you dress in multiple layers, so you can fine-tune the warmth of your clothing. Several wool sweaters, one over the other, are my choice for a winter hike. I like ones that zip all the way down the front, so as to ventilate better when going uphill, or when moving 50 large Rubbermaid totes from one truck to another, as is common with Never Done Moving Stuff (National Disaster Medical System). On winter hikes, I tend to wear one or two pair of thermal long underwear (Patagonia Capilene 4 = Expedition Weight = Thermal Weight) under my outer pants, depending on the expected temperature. And yes, I buy winter outer pants 2” larger in the waist to accommodate this.
- For disaster or search and rescue response, you tend to be mostly cold, it’s just a question of really cold outside and sorta cold inside a building or tent with only some heat. For this, I dress my legs with thermal underwear and outer pants. For my top, I wear layers like for a winter hike. But my inner layer is a wool T-shirt, so I can strip down when inside. Wool you say? Yes, wool. Good quality wool T-shirts aren’t scratchy at all, and they are best at not smelling bad after days of use without a shower. Wool is better for this than even the best artificial-fiber T-shirt, overpriced Under Armour ads notwithstanding.
- Mittens are warmer than gloves; make sure you have some mittens. It’s traditional for winter hikers and climbers to wear a thin pair of liner gloves under a thick pair of mittens. However, you can now get semi-thick gloves that allow you to use a cellphone without taking off your gloves (Outdoor Research Sensor gloves are my favorite). So in most winter conditions where I live near Pittsburgh, I’ll wear these gloves, and when needed, put a pair of Gore-Tex mitten shells (Outdoor Research Revel Shell Mitts) over them. Works well except in severe cold.

Any time you’re in the field in a cold-wet environment, there are two pieces of Personal Protective Equipment you should always have in your pocket: two leaf bags. If, for instance, your tent catches on fire and you have to dash out into freezing rain, the protection those two leaf bags provide may save you from dying of hypothermia, at least right away.

To learn more about how to select outdoor clothing, see my Clothing Materials Table and attendant essays at conovers.org/frp/Clothing-Materials.pdf.

Food

Food is important Personal Protective Equipment. Really. Some survival schools go on and on about how to build a fire. But you have a fire inside you, and the fuel is food; the best way to get warm is to insulate yourself and stoke your inner fire.

When you think about disaster food, you think about MREs: military Meals, Ready to Eat. I won’t say what people think about MREs, but I will tell the story of a Disaster Medical Assistance Team Strike Team that was sent to an island off the Gulf coast right after hurricane Katrina, with cases of mixed MREs as their sole food. However, the cases were mislabeled, and they contained nothing but pepper steak dinners. They were stuck there for a week without resupply. If you buy me a beer sometime I will tell you what they thought – and said – about MREs. However, being old, I have survived on C rations and even tasted K rations, the canned predecessors to MREs, and I will tell you that MREs are fine and I (and you) can subsist on them indefinitely without being too unhappy, at least if they’re not all pepper steak MREs.
MREs are available with flameless heater bags that will heat a main course even in deep winter.

MREs are a bit low in dietary fiber, and high in fat to provide lots of energy for fighting troops, so if you eat a healthy diet, supplement with something high in fiber. Some dried fruit seems to be a fairly universal addition to people's MREs.

DMAT and other disaster team members and SAR team members, who are required to carry a day or so of food in their packs, sometimes just thrown in an MRE or two. The only problem with that is that MREs are heavy. There are lighter alternatives. Again, look to backpackers and climbers: they tend to take freeze-dried meals, which are very light. There are also compressed versions that pack small; the Mountain House brand is (deservedly) the most popular, though there are several reasonable alternatives. They do require water for rehydration.

P.S. Those little tabs of chewing gum in the MREs? No, they’re not laxatives. Maybe they should be. But they’re just gum. I have this straight from Dr. Askew, who designed MREs and many other interesting foods for the military, including high-carbohydrate pocket milkshakes for working at altitude.

There are other things worth taking; recently the fat in nuts has been found to have health benefits, and fats provide far more energy per unit weight than carbohydrates (starch and sugar) or protein. Almonds are my favorite: salted for the summer, plain for the winter. Stoned Wheat Thins are a fairly dense, sturdy cracker that makes a pretty good salty summer survival food, though I really like those MRE cracker packets. I bought a large box of them online. I throw a couple of packets into my gear for search and rescue and disaster response. My family also likes them for our hiking lunches. They’re a bit dry, but we found that dipping them into one of those little cups of applesauce makes a nice combination. Add a can of tuna in olive oil, or a can of Costco chicken, and you’ve got a great lunch. Granola bars also seem to be popular.

Federal disaster teams require military-style boots, and you can find fairly good military-style boots, as well as cheap, poorly-designed ones. But if you don’t have to be in uniform, then a pair of good medium-duty hiking boots is ideal. If responding in deep winter, though, you’ll need something warmer. Don’t try to make your summer boots warmer by cramming a second pair of sock into them: this cuts off circulation and leads to “Two-Sock Frostbite.”

You can get good winter boots at REI. I particularly like my Salomon X Ultra Winter CS Waterproof Winter Boots; they cost $160 but are worth it. They’re even mostly black and wouldn’t look bad with a Federal DMAT uniform. For extremely cold conditions, though, you’ll need a bigger, thicker, klunkier boot, and for $150 at REI, you can’t beat the Sorel Conquest boots.

You will need to break in your boots prior to deployment. This is critical. Blisters on your feet are no joke. I can’t count the number of times disaster or search and rescue responders show up in new boots and then are disabled because after the first couple of days they can barely walk.

I would recommend that you walk or hike 30-50 miles in a pair of boots to consider them broken in.

The other thing you need to do is to fit your boots with the proper socks, and make sure you have the proper socks.

The military have focused a lot of effort on the problem, as it’s so disabling to troops who have to spend a lot of time hiking and walking, especially during boot camp (there’s a reason they call it boot camp!) at Camp LeJeune.

Murray Hamlet, of the US Army Research Institute of Environmental Medicine, in Natick, MA, is the world’s leading expert on a number of things, including the use of yaks in warfare, but we are particularly interested in the fact that he spent years of research, using recruits at Camp LeJeune as guinea pigs, on blisters.

One thing he found (and most outdoorspeople know) is that cotton makes bad socks. Wool is much better, even in the summer. It doesn’t hold water against your foot, and it doesn’t mat down into a hard plate under your foot like cotton, it keeps providing some cushioning for your sole. Here’s an excerpt from my essay and table on clothing materials (conovers.org/ftp/Clothing-Materials.pdf).

“As far as I’m concerned, wool has always been in – at least for socks. Socks that are at least partly made from wool are superior to any synthetics. True, they’re smelly when wet, and take a long time to dry compared to synthetics. But unlike synthetics, they keep their spring, and avoid matting down under your foot. And the padding provided by wool under your foot is nothing to sneeze at. A good wool sock can extend by hours the time when the bottom of your feet say “no more”! But wool socks were so scratchy that people hated

**Feet**

If you’ll be traveling across rugged terrain or through debris, you’ll need good foot protection.
them. Used to be, everyone wore Ragg wool socks made of hard, scratchy wool, and thin liner socks to protect us from the scratchy Ragg socks. (Don’t believe those who said it was to prevent blisters.) You can buy things called Ragg socks but they’re pale, soft and wimpy imitations of the he-man Ragg socks that were available back in the 1950s and 60s.

“Ah, but if your socks are made of a fine merino wool – like expensive dress socks only thicker – they aren’t scratchy! It used to be that only Rohner of Switzerland made merino-wool socks. Merino wool is soft, tough, and expensive. Their socks are great, and I seldom wear anything else. Nobody thought that customers in the U.S. would pay the extra for merino wool outdoor socks.

But then in 1994, SmartWool started selling expensive merino wool socks, and they sold like hotcakes. And soon everyone was selling merino-blend socks. The military now use socks that Murray Hamlet developed for the military to prevent blisters. They’re like SmartWool socks, but inside out, with the terry-loop towel-like bits on the outside of the sock. This prevents blisters better, and you can reproduce this effect by wearing your SmartWools inside out. (You can get SmartWool socks at REI or rei.com.) The Rohner socks I wear all the time are already built inside out like this, and indeed their terry-loop is denser and harder than SmartWool’s, which Murray reproduced in his military sock design.”

The new sock for the military is known affectionately as the Hamlet sock. A variety of companies make them, including Thorlo, Wigwam, REI and others. For some reason, they tend to sell them with the padding on the inside, but Murray insisted that you’ll get less blisters by wearing with the terry-loop padding on the outside, like the Swiss Rohner socks I wear. There are REI stores at in most major US cities that carry lots of these socks. You can also get them from rei.com; just search for “merino wool hiking socks.”

**Lighting**

One of the problems I always encounter in disaster and search and rescue medical situations is that the light’s no good. Even when I was young and had a sharper eye, this was a problem. When you can’t really see it, trying to read a BP cuff, or suture a wound just doesn’t work. And even if there is someone free to hold a flashlight (almost never), they always get distracted and end up shining it in your eyes. And putting up a tent while holding a flashlight just doesn’t work. And in the winter in the higher latitudes, there’s not that much daylight, so you’ll be using your light a lot.

So one piece of “medical” equipment that I always carry is a good headlight. For about $40, you can get an excellent headlight from REI. I recommend a Petzl Zipka, which is an outstanding headlight for short-term use. It fits in your pocket. It takes 3 AAA cells, which fit in the body that straps to your forehead, and, compared to headlights that take larger batteries, the weight on your head is negligible. There are more expensive models with extra features, and they are probably worth it if you can afford one, but the Zipka is fine. You should probably avoid headlamps with rechargeable batteries, as recharging may be a problem.

Get Energizer disposable lithium AAA cells, as lithium cells perform better in the cold, have a longer shelf life and weigh less than alkaline cells. They cost roughly twice as much per battery, but they also last roughly twice as long; it ends up costing the same, and you don’t have to change batteries as often. Remember to pack spares, and in a small plastic ziplock bag to protect from moisture.

**More**

To learn more, so as to be better prepared to respond to disasters in the cold and in the wet, there are many resources online. Here are four to get you started:

- Check out how the Navy Seals deal with getting soaking wet while in winter conditions.
- For a quick summary of why you need to know so much about PPE for cold-wet conditions, read through [http://conovers.org/ftp/Hypothermia.pdf](http://conovers.org/ftp/Hypothermia.pdf), which is only two pages and most of it is pictures.
- Imagine a really OCD-ish person, one who has been involved in search and rescue and disaster response for 45 years. Imagine the equipment such a person would acquire over the years, and then imagine that this person has made a detailed packing list with lots of footnotes. Better yet, instead of imagining, look at it online: [conovers.org/ftp/SAR-Gear.pdf](http://conovers.org/ftp/SAR-Gear.pdf). It may give you some ideas for making your own checklist.
- If you are interested in learning more about clothing materials, sleeping bag insulation and foam pads, check out [conovers.org/ftp/Clothing-Materials.pdf](http://conovers.org/ftp/Clothing-Materials.pdf). It is a lot longer than two pages, and not that many pictures. Sorry. I hope you find this information useful.

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2. Obsessive-Compulsive Disease