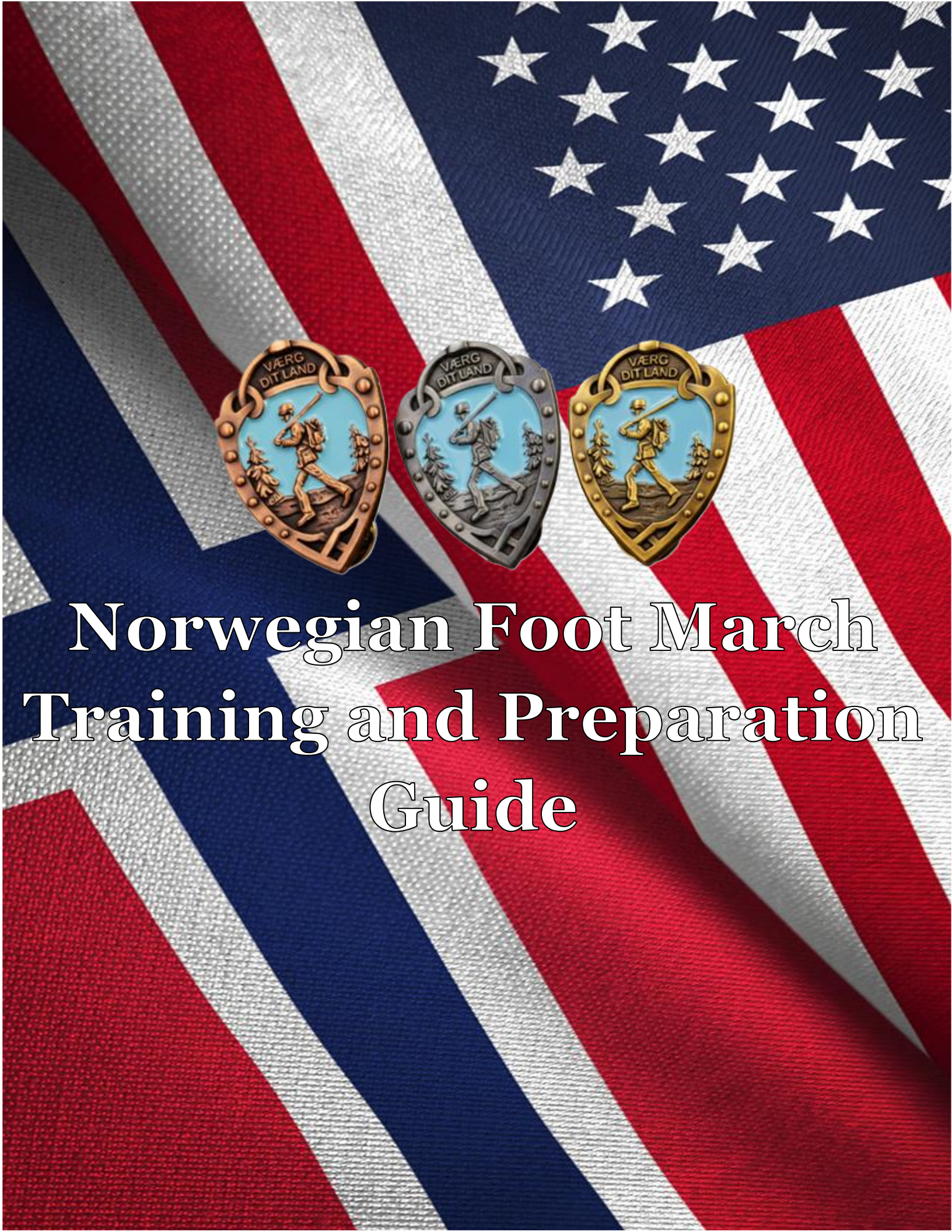


Norwegian Foot March Training and Preparation Guide

Norwegian Foot March Training Guide

How difficult is the Norwegian Foot March?

Historically, the Norwegian Foot March is one of the most difficult Norwegian proficiency badges to earn, with an average pass rate between 65-75%, depending on service, component, occupational specialty, and individual fitness.

How should I prepare for the Norwegian Foot March?

Preparation begins with strength and cardiovascular training before the ruck march. The march's pace often requires participants to run portions of the route under load with a comparatively low ruck weight; thus, cardiovascular training should be the foundation of training plans. Training plans should focus on increasing VO_2 maximum, lower body strength, and Zone 2 endurance (conversational work pace, 60-70% of max HR), running, and rucking. Maximizing sleep significantly improves recovery and results. Total weekly mileage (combined running and rucking) should ramp up from 10 miles a week to beyond 20 miles a week in preparation for the event (Note: This is a recommendation. For medium- and long-distance races, weekly mileage should match or exceed the distance of the race).

Why do people fail the Norwegian Foot March?

Discounting catastrophic injuries and disqualifications, Soldiers fail to meet the time standard for the NFM for four reasons:

1. Inadequate hydration
2. Lack of cardiovascular or muscular endurance due to lactic acid buildup
3. Lack of energy
4. Minor injuries accrued due to inadequate preparation (blisters, joint pain, etc.)

What do you mean by Inadequate Hydration?

The human body requires a balance of both water and electrolytes to maintain homeostasis. During exercise and daily activity, the body loses both through respiration, urination, defecation, and perspiration. A lack of either water or electrolytes makes heat (heat stroke) and cold (hypothermia, frostbite) injuries significantly more likely. Muscle cramps occur due to the disruption of the electrolyte balance necessary for muscle function. Hydration also allows for urination, which is critical for moving toxins created from exercise out of the body. Myoglobin, a protein released during muscle breakdown, is toxic to the kidneys in excessive amounts.

Failure to adequately hydrate can cause rhabdomyolysis (rhabdo), which can cause kidney failure.

How do I prevent this?

Hydration begins well before the event. The best indicators of hydration levels are urine color and volume. Urine should not be completely clear (this indicates a lack of electrolytes) nor yellow (this indicates a lack of water), but instead a light yellow. Thirst is a delayed and inadequate judge of hydration (though if you are thirsty, drink!). Soldiers should utilize aid stations and drink and eat throughout the race. 1L of water combined with 600mg of electrolytes (potassium, sodium, calcium) per hour of rucking is sufficient to prevent dehydration. The source of the water and electrolytes can be liquid (Hoist, Gatorade) or solid (LMNT, Gu), whichever is easiest to consume. Avoid chugging liquids or gorging on food during the march. You should sip or eat slowly to avoid cramps and vomiting. Training reveals hydration needs (as all hydration needs are dependent on an individual's biology as well as environmental conditions such as temperature) and should always be done under proper hydration. Starving yourself of water and electrolytes does not make you "more resistant" to dehydration. Instead, it compromises the value of your training by preventing exercise at your maximum output.

What do you mean by lack of cardiovascular or muscular endurance due to lactic acid buildup?

Your body consumes oxygen during the generation of Adenosine Triphosphate (ATP) via aerobic cellular respiration. The body's ATP requirement is linked to how much energy is required to do the required movement. If the body does not have enough oxygen to produce ATP, it will switch to anaerobic respiration, which produces significantly less ATP (17x less) and creates lactic acid as a byproduct. This acidity causes pain and slows down muscle output until the body has repaid this oxygen debt and reconverted the lactic acid back into pyruvate or glucose.

How do I prevent this?

The best way to prevent lactic acid buildup is through aerobic training, which is discussed later. Larger muscles and more efficient muscles (both developed by training) mean less overall and more efficient oxygen usage for the same energy output, which prevents lactic acid buildup. Work needs on the body rise throughout exercise, as does heart rate. As such, it is far more difficult to increase output at the end of the race than it is at the start. Moving efficiently also decreases energy usage. Soldiers should focus on long runs, rucks, as well as moving at either a fast walk or

shuffle that minimizes wasted energy. Excess weight carried, whether through fat or excessive ruck weight, also decreases aerobic performance.

What do you mean by lack of energy?

Glucose is also required to produce ATP. While the body can draw upon fat and proteins and use them as energy sources through ketosis or protein catabolism, both processes are less efficient than the use of pure sugars or starches such as glucose, fructose, sucrose, and glycogen. Hitting the wall, or "bonking", refers to the depletion of the body's glycogen stores and switching to ketosis or protein catabolism for energy. Aerobic output plummets and is difficult to recover, even with proper nutrition after hitting the wall.

Using the Pandolf Equation, we can expect a 150lb male with a 25lb load moving at 15min/mi on pavement with an average grade of 2% to burn approximately 620 calories per hour. We would therefore expect them to burn approximately 2800 calories over the course of a Norwegian Foot March. This caloric requirement increases for heavier participants. The body is only able to store between 1500 to 2000 calories in the form of glycogen in the muscles and the liver. As such, with no additional food consumed during the march, the Soldier should expect to hit the wall with a significant decline in aerobic output at approximately 2:30 or 3 hours into the race. This is why a significant dropout rate is observed at the 3-hour mark.

How do I prevent this?

Adequate nutrition begins before the race. Soldiers do not need to "carb-load" several days before but should take care to eat carbohydrate-rich foods the day before and morning of the race. During the march, Soldiers should consume an excess of 1300 calories, in stages. The best form of this is pure glucose, found in running gels such as Gu. Sugar (either fructose or sucrose) from sweets is also perfectly acceptable. Fats and proteins can be appetizing and do not harm the Soldier, but do not provide the same benefit as sugars during the race (though they will help with recovery). A good rule of thumb is to consume 100-200 calories every two miles. Pack items that you're able to eat easily at a comfortable pace.

Proper aerobic training also reduces the amount of energy expended and makes the body more adaptive to ketosis and protein catabolism.

What do you mean by minor injuries due to inadequate preparation?

This refers to blisters and joint pain that comes from friction or overuse of untrained parts of the body. They can be extremely painful and eventually debilitative.

How do I prevent this?

Blisters are prevented by proper footwear and training in said footwear. Footwear refers to boots and socks. Good socks are typically wool and should fit the foot snug but not too tight. Fox Rivers or Darn Tough socks are recommended. Leather boots require "breaking in" whereby the user rucks or walks in them to both form the leather boot to their foot and form their foot to the leather boot. Boots should be tied so that they are snug enough to prevent rubbing, but not tight enough to prevent circulation. Common hot spots and blister spots can be pre-taped before the event to prevent the sock from directly rubbing on the skin.

Joint pain, such as that which afflicts the ankles, knees, and hips, can be prevented through adequate rest, warm-ups, stretching, as well as training. The body increases joint, tendon, and ligament strength through resistance training. This is most effectively done through isometric exercises but also happens with aerobic training and strength training. Contrary to widespread belief, running and rucking are not bad for your joints. People who stay active throughout their entire lives can continue to run and ruck into their retirement years without issues.

Prevention of joint injury and increasing joint strength is done with the following steps:

1. Sleep as much as possible. Sleep is as potent as any performance-enhancing drug. It massively increases hypertrophy and allows recovery from impact.
2. Warm-up relevant muscle groups before all exercises.
3. Start small; Increase weekly mileage or weight gradually.
4. Practice proper form while exercising (for both lifts and runs).
5. Integrate isometric exercises to strengthen joints.
6. Minimize or control unnecessary high-impact exercises (ruck-running).

Which is better for training the NFM, running or rucking?

In the specific context of the Norwegian Foot March, running is the superior training tool due to the low pack weight. Regardless, rucking should be integrated with running to adapt the body to the specific movement. A good plan should include a weekly or biweekly ruck along with runs and other training.

How should/do I run?

Running begins with proper footwear. Shoes should fit the feet (decent size, good cushion, adjusts for pronation). This can be done at a variety of running stores, such as Fleek Feet. Proper running form should seek to emulate barefoot running, with the quietest stride possible, landing on the ball of the foot (and not the heel unless

shuffling). This more effectively distributes the impact across the joints (toes, ankle, knees, hips) and allows a push-off from the ground instead of a roll. Warm-ups increase performance and decrease injury.

A good distance running plan should consist of three general workouts:

1. Sprints/Repeats: Designed to target both anaerobic and aerobic endurance through high-intensity sprints. Work-to-rest ratio at maximum output (such as for 100 or 200m repeats) should be 1:3 to ensure the body is able to replenish ATP between each repetition. For longer distances (300m to 800m repeats), the work rest ratio should be 1:1. Runners can also integrate hills to increase workload.

2. Tempo Runs: This run is slightly slower (10-20%) of race pace (best defined for non-runners as your mile-split for your AFT 2-mile run) and engages the aerobic pathways. Distance should be similar to the race distance or IVO 3-6 miles. The goal is a constant effort to raise and keep the heart rate high, but not too high as to avoid anaerobic respiration. The purpose is to increase aerobic endurance and VO_2 max.

3. Long, Slow Distance (LSD): These runs should make up 70% of your mileage. As the name suggests, they are long (4+ miles), slow (conversational pace, zone 2) runs that help build aerobic endurance and joint strength. They have a significant impact on resting heart rate and overall recovery and form the basis for ultramarathon training.

Beginner runners should strive to start at 10 miles of running (combine mileage with rucking) per week and increase their mileage by 1 to 2 miles per week. As stated previously, a weekly mileage of 20 miles will be adequate for the Norwegian Foot March. 10 weeks is more than enough time to go from not running to being fully prepared for the Norwegian Foot March.

What about rucking?

Rucking is also important, as the increased load targets upper body stabilization muscles and distributes (and possibly lowers) impact on the lower body due to the different stride used. Running alone cannot emulate the heavy, large loads present in combat or training plans for military schools. Similar guidance is recommended for rucking as for running.

1. Type of Ruck: The Norwegian Foot March only specifies a “military approved ruck”. The standard issue MOLLE 4000 ruck, with a plastic external frame, is

designed to be worn with body armor and is a mediocre, but acceptable, option for competitive rucking. Vertically shaped rucks or those with internal frames provide different weight distribution. Other military rucks include the ALICE pack, as well as more expensive options offered by companies such as Mystery Ranch, GORUCK, or Tactical Tailor. These rucks are pricey, but significantly more comfortable than the standard-issue MOLLE ruck.



Figure 2: MOLLE ruck (left, UCP) with ALICE pack (right, green)

2. Preparation of the Ruck: Pack the ruck so that most of the weight is high (shoulder blade height) on the Soldier and centered on their spine. Fill the lower part of the ruck with compressible items (such as a sleeping bag) to support higher and heavier items. Side and sustainment pouches should carry light items or remain empty. The Soldier can also move the ruck up and down the frame. All items should be tightly packed to prevent movement and swaying. The water source (such as the camelback) should be placed on top for easy access, below the top flap.

3. Wear of the Ruck: The Soldier should wear both the chest strap and waist strap to distribute the weight from the shoulders to the hips and therefore spread the load. They can then adjust the top and bottom shoulder straps according to their preference. Tight, but not too tight, is best. The closer the weight of the ruck is to

the body of the Soldier, the better they will perform and the less painful the ruck will be over time.

4. Moving with the Ruck: The Soldier should seek to walk as much and as fast as possible with the ruck.

5. Progressive Overload: New ruckers should start with a 6-mile ruck with a light (25-35lb) load at a moderate (20-17min/mi) walking pace. For the Norwegian Foot March, training with a heavier load is unnecessary. Speed and distance should be increased gradually (1-2mi or 1min/mi faster than before).

What about Ruck-running?

Ruck-running allows the Soldier to move significantly faster than their walking pace with the ruck. It is extremely impact-heavy and can easily lead to long-term injuries. It is also less efficient than simply walking. Most people, with adequate training, can learn to walk at 15min/mi without running. The Norwegian Foot March is light enough, long enough, but fast enough that ruck-running is a viable and often necessary option for those who struggle to walk at fast speeds. If you are going to ruck-run, it is important to run with a form closer to a shuffle to minimize impact and energy output.

During training, avoid ruck-running. It is ineffective and inefficient compared to running, rucking, or weight training. Soldiers should focus on walking (defined as one foot always being on the ground) as fast and as long as possible.

What about boots?

For the NFM, the best boots are the ones you have already trained with or worn in. However, several approved boots hold clear advantages (such as weight) over their counterparts. The lighter and more similar a boot is to a running shoe, the better it will be for the NFM.

What about heat and hills?

Training in the heat is an opportunity for both physical and mental improvements. Heat naturally increases heart rate and allows the body to acclimate to the environment. This acclimation is both psychological and physiological. Even though the NFM is not supposed to be conducted if the outdoor shade temperature rises above 25C (77F), the military uniform and ruck, combined with the exertion, means that the Soldier will heat up and sweat even in cold weather. As such, integrating heat into training is important and will help to improve aerobic capacity and avoid heat casualties.

Hills serve a similar function to heat and should be integrated whenever possible. Uphill travel works different muscles than movement on flat terrain, and downhill movement increases workload on stabilization muscles as well as impact.

What about race week?

Training during race week will have little positive effect on your performance. Stay active but decrease your workload and rest up for the march.

How do I pass the Norwegian Foot March?

Hopefully, your training will pay off. Below is a guideline for the execution of the race.

1. Week Before The NFM
    a. Taper training, stay active with light runs or exercise throughout the week. You are unlikely to get much faster and stronger and more likely to fatigue yourself.
    b. Sleep as much as possible, especially 2 days from the event.
    c. Avoid alcohol, which decreases recovery and aerobic performance.

2. Day Prior to the NFM
    a. Eat several carbohydrate-rich meals.
    b. Gorge on water and electrolytes to ensure proper hydration.
    c. Pack your ruck and weigh it. Include an extra pound of dry weight over the standard to account for any discrepancy in the weighing.
    d. Put tape or moleskin on any known hotspots or blisters so you do not have to do so during the race.
    e. Get a good night's sleep.

3. Day of the NFM
    a. Wake up at least an hour before the race to ensure that your body is fully prepared for the exertion and has cleansed itself of sleep hormones.
    b. Relieve yourself. Many participants will often take an antidiarrheal before the race to avoid having to waste time at the latrine during the race.
    c. Eat and hydrate without gorging. A small meal rich in carbohydrates will provide your body with vital nutrition and energy.
    d. Consume a moderate amount of caffeine. Caffeine is an effective aerobic enhancement, improving ketosis by approximately 5%, as well as masking the effects of tiredness. Nicotine also improves aerobic performance and can be used (not via smoking, but with Zyn or similar mediums).

e. Pack snacks and water sources in places that are accessible during the march, such as your pants pockets. Your nutrition is useless if you do not use it or cannot access it during the march.
f. Warm up with a short jog and dynamic stretching. (Focus on legs).
g. Start the race.
    i. Start slightly faster than the required pace to account for slowing down at the end or latrine breaks. Alternating between walking and jogging between light posts is an effective strategy to conserve energy while maintaining a fast pace.
    ii. Try to consume 0.5-1L of water per hour and 600mg of electrolytes per hour.
    iii. Eat 150-200 calories every two miles if possible. Any food helps.
    iv. Stride the downhills. Allow gravity (and do this carefully to avoid injury) to quicken your walk to a stride to save you some time.
    v. Stay motivated! March with a friend you can talk to and encourage each other. While the ruck may feel endless, the badge and experience are worth the pain.
h. Finish the race under your allotted time.

4. After the NFM
    a. Keep moving to avoid cramps.
    b. Get your certificate of completion (and badge). Please take a photo of this document and store it in a safe location.
    c. Continue to hydrate and eat after the race to replenish utilized nutrients. Do not feel guilty; you have earned the right to gorge yourself. Many participants have burned 1,800 to 3,000 calories during the NFM and eat 2+ meals afterward. Alcohol will inhibit your recovery.
    d. Stretch out lower body joints and muscles only to the point of light pain.
    e. Shower or take a hot bath, and treat any hotspots, blisters, or cuts to prevent infection and pain.
    f. Sleep as much as possible.
    g. Make a copy of your NFM certificate.
    h. Create a PAR in IPPS-A to upload your NFM certificate.
    i. Take it easy for the next three days.