NJSAR Fitness Test (NFT) training based on data (terrain, speed, elevation, heart rate)
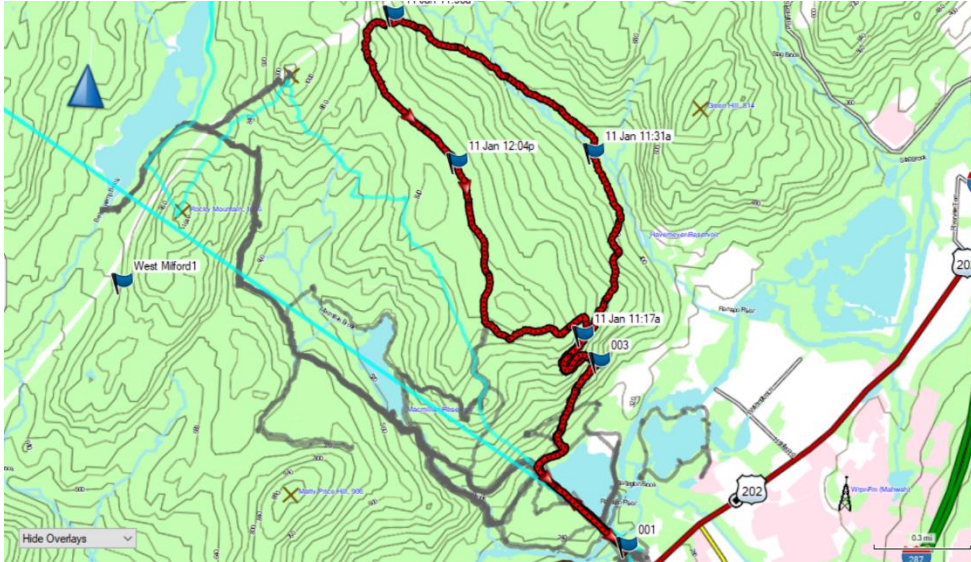

See the NFT fitness test route on SARTopo here: https://sartopo.com/m/70JJB

Analysis and strategies for improving personal NFT performance (time)

1. **The terrain profile**
   A) Helps us deciding on the strategy for the fitness test. Do we go all out or do we need to use more/less energy depending on the terrain features? Do we run in the beginning, uphills, downhills, flats or not at all? What is the most efficient strategy in terms of our personal strengths or limitations?
   B) Gives us specific information on the training plan. We know the demands of the route - where the steep inclines are and where we can gain some time back. Based on this knowledge, it is easy to plan a training program that prepares for the exact demands of the terrain. We can use a hill or a treadmill with incline to mimic the terrain profile and train accordingly. Our bodies become very efficient once our physiology is exposed to the variables of the challenge repeatedly. In other words, make your training as close to the test as possible.
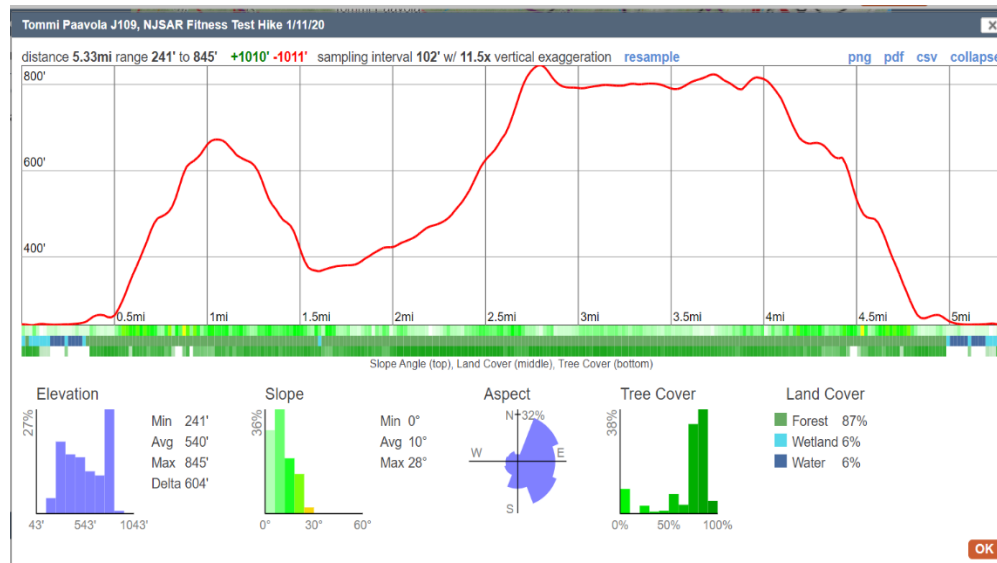
   Here is the terrain profile of the NFT (Garmin Basecamp)
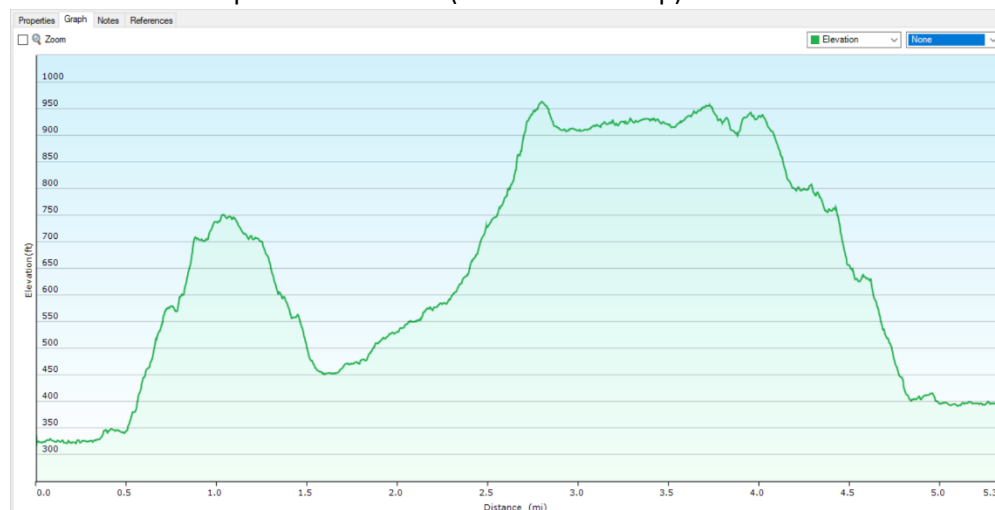
The simple terrain profile breakdown is:

- Start to .5 miles: flat
- .5 miles to 1.0 mile: steep incline
- 1.0 miles -1.5 miles: decline
- 1.5 miles to 2.8 miles: gradual incline
- 2.8 miles to 4.0 miles: flat
- 4.0 miles to 4.9 miles: steep decline
- 4.9 miles to 5.3 miles: flat

We can gain more information looking at another profile image (SARTopo)

This graph gives us more information about the grade of the incline. We can, for example, set the treadmill to a corresponding incline (most of them only go up to 15 degrees, while some of the actual terrain incline is around 30-40 degrees). Ultimately, we can plan a workout that mimics the time, terrain and speed of the desired test result.

Sample treadmill incline program for improving NFT time:

- *Start to .5 miles: flat*
- *.5 miles to 1.0 mile: 15°*
- *1.0 miles -1.5 miles: flat*
- *1.5 miles to 2.8 miles: gradual incline from 10° to 15°*
- *2.8 miles to 4.0 miles: flat*
- *4.0 miles to 4.9 miles: flat*
- *4.9 miles to 5.3 miles: flat*

For the first time doing this treadmill workout, you would want to do it with your backpack (25lbs) on and with about 90% effort level. Record your total time and pay attention to the split times at different portions of the route.
The next time your goal would be to improve your time by giving about the same effort as the first time. After repeating the workout once or twice a week for about 3-4 weeks, you should see a noticeable improvement of your time (and fitness)

2. **The speed data**

   A) Gives us information how to use speed in a smart, efficient way. For example, trying to use your speed in the uphill portions of the route might not be the best strategy as the level of effort and the gained time are not worth the exhaustion. The flats and downhills that can be navigated safely with speed are the portions of the route where we can really make some time gains. If you decide to run, those are your best attack points.
   B) Allows us to train for improvement in speed with precision. Once we know our average speed, we can already start working on improving the total speed. If we have access to our speed in different portions of the route, even better. Most of our GPS apps track speed as and it is not difficult to collect good speed data.

   If you have already done the NFT before, you can easily calculate your average speed for the course knowing your time and the distance (5.3miles). You can use a speed calculator to make it even more simple.
   https://www.calculatorsoup.com/calculators/math/speed-distance-time-calculator.php

   By knowing your average speed, you can track where and for how long you fall below the average and where you are able to stay above the average speed. If my lowest speed (incline) is 2 mph and my fastest speed is 4 mph (flat and decline), I can make a specific training goal to improve my incline speed, for example, to 2.2 mph and flat speed to 4.2 mph.

   By improving average speed from 3.0 mph to 3.2 mph would result in about 7 min improvement in total time. So, you can play around with numbers and see where your average would need to be. The calculator above is helpful for that (you can choose between time, speed and distance).

   If your goal is to improve your top end speed or the incline speed for the test, you certainly don't have to do full 5-mile hike or a workout. Speed and uphill workouts can be shorter while more intense by nature. You can pick a nice uphill and walk up the hill 5-10 times with faster speed than you would in the test. If your planned test speed for the incline is 2.2 mph, do the training 2.5 mph and you will build a 'reserve' of speed.

   If your goal is to see whether you can move the needle for the speed walking or running, do it in shorter distances – such as .5 or 1.0 miles at a time. You might want to do your shorter training hike/run 5.0 mph and then the 4.5 mph during the actual fitness test will feel much less strenuous. Overall duration of these speed and incline workouts can be as short as 15-30 minutes if the workout challenges your current capacity.

3. **The heart rate data**

   A) Indicates how hard your body is working. Heart rate is an accurate, yet easily accessible, indicator for the level of stress the body is experiencing. It can be used in variety of ways in training, so tracking the heat rate is a great idea for anyone who wants to get precise with their cardiovascular conditioning programs. In training for the fitness test, you would want to lower your heart rate at a given speed. For example, if your heart rate on flat ground with 4.0 mph is 155 beats per minute right now, the goal of the training program could be to lower the heart rate to 150 bpm while keeping the speed at 4.0 mph. In essence, your goal would be to lower the stress the body goes through at a given speed. As a result, you would have more energy left for another portion of the

route or you could decide to increase your speed on the flats to let's say 4.2 mph due to the increase in your cardiorespiratory capacity.

Below is a graph that shows how incline influences the heart rate. You can easily see the uphill is the 'killer', at least for this particular individual (me). The incline dramatically slows down the speed and ups the heart rate. You might want to decide whether your training focus is to a) lower your HR on the uphill b) increase your speed on the flats/downhills. You can train for both but sometimes you can identify a 'sweet spot' that gives you the most improvement for your investment of energy and time.
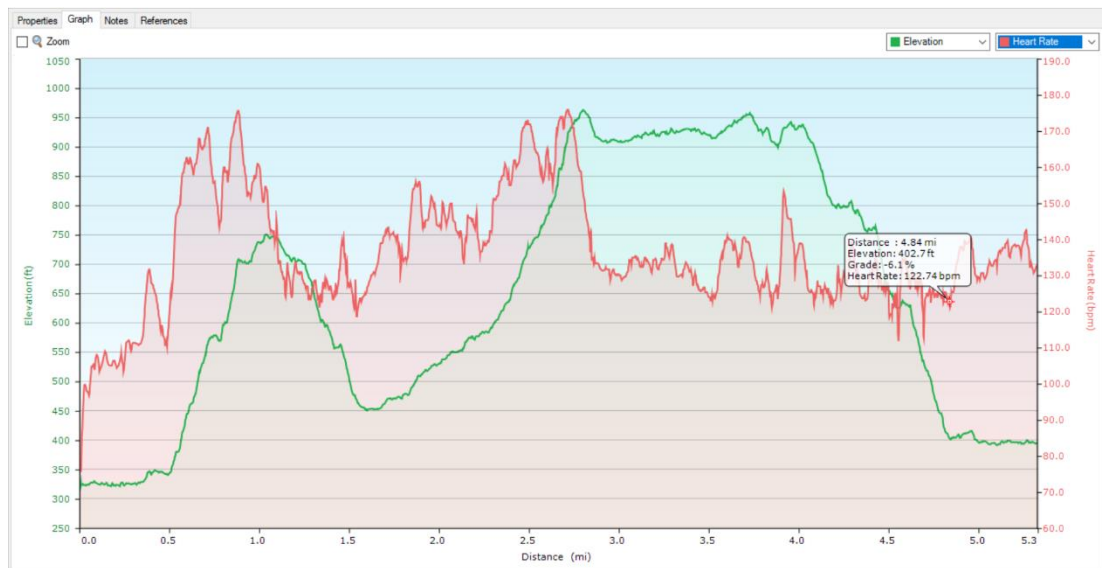
B) Functions as an indicator of your state of recovery. The resting heart rate can be used as a fairly precise measurement of your recovery. You can measure your resting heart rate in a following way:
- **Before** you get up in the morning, measure your heart rate by counting the beats per minute.
- Repeat this at least three mornings in a row and count the average of the three measurements.

The resting heart rate can be used to:

-determine whether you have improved your cardiovascular fitness level in long term. The lower the resting heart rate, the lower the effort of your heart muscle, which equals better cardiac fitness.

-determine whether you have recovered from your previous workout (or a stressful day). Elevated resting heart rate normally means that you are still recovering, had a poor sleep, are feeling anxious etc. Those days might not be the best days for high intensity workout but are great for low intensity walks and hikes.

There is much more to the heart rate that we won't cover here. If you are interested, please find out about *aerobic and anaerobic thresholds* that can help you find the most effective heart rate zone to train at. You might also have access to *HRV (heart rate variability)* through a more advanced fitness tracker. HRV is an excellent tool to track your recovery and time your workouts optimally.

SUMMARY - How to train for the Fitness Test (NFT):

1. Make it specific. The best way would be to do the actual NFT route and create a strategy of utilizing your energy and speed the best possible way. The second-best option is to simulate the test terrain and speed profile wherever you like to walk/run/hike or on a treadmill with more controlled variables.

2. Give yourself a month or more to make a noticeable improvement in your fitness test. Do at least 6-8 specific workouts for NFT fitness.

3. Concentrate on improving the areas that slow you down the most or that you feel there is the most room for improvement.

4. Allow your body to recover between efforts by tracking your resting heart rate.