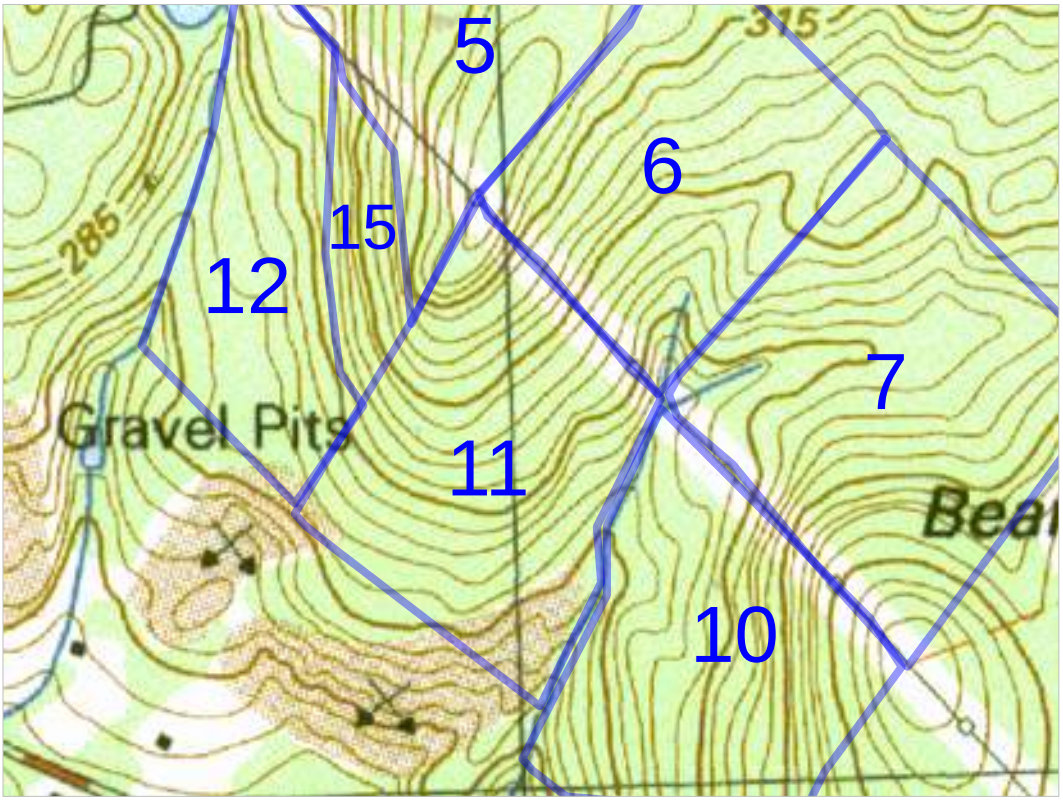
Unit 18, Land Navigation V: Grid with Compass.
Date Last Updated: February 20, 2020



Consider this set of segments.

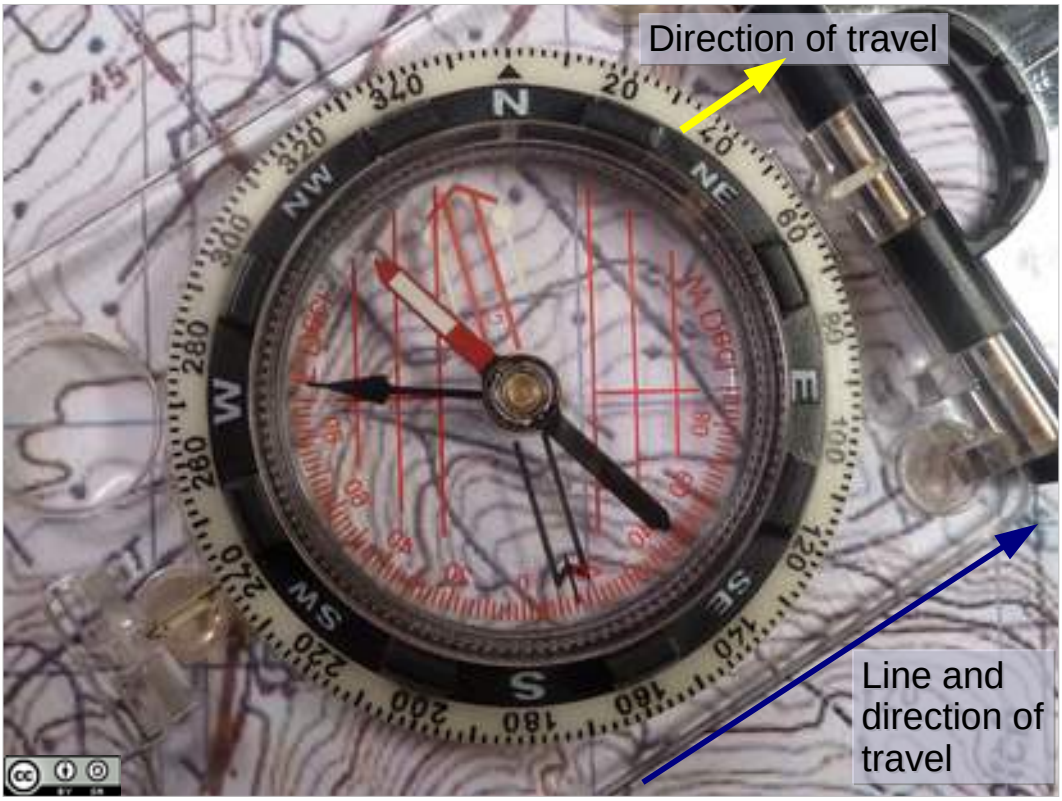
What skills do you need to accurately search one these segments? (Discuss (for example, 6), consider segments, handrails. boundaries, landmarks, marking segment boundaries). [map area is about 1km across]

Determine distances on the map and the ground.

Identify landmarks on the map and the ground.

Travel accurately along compass bearings determined from the map.

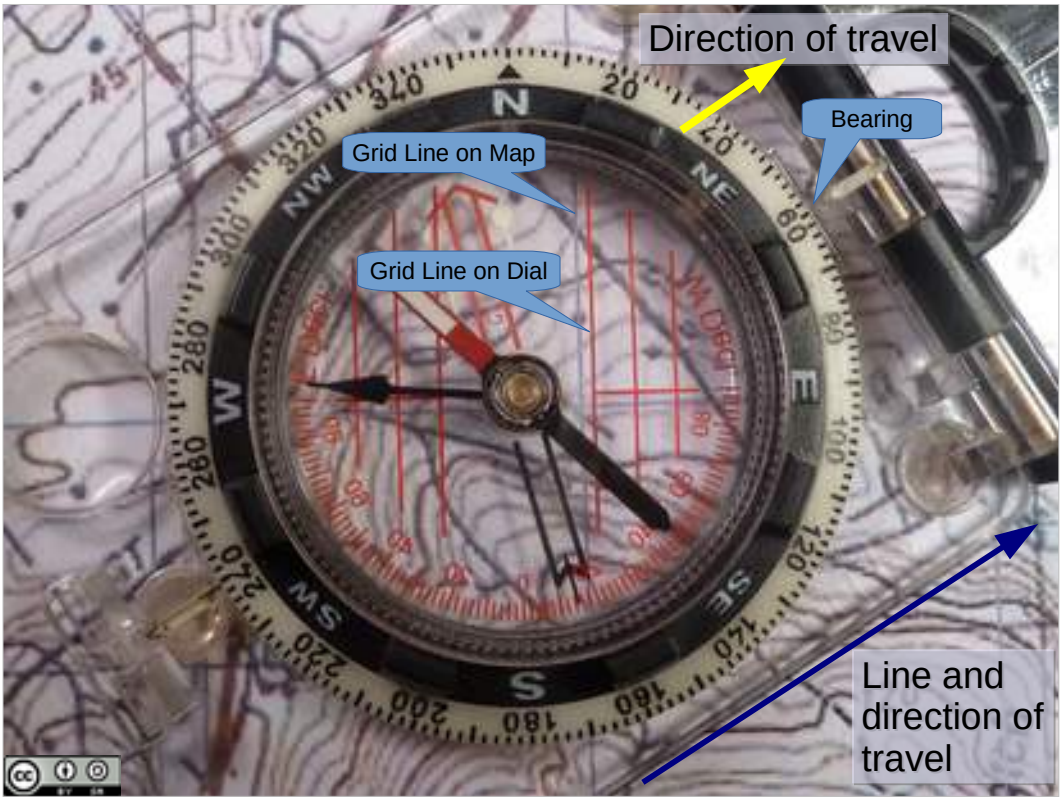
Accurately travel defined distances along compass bearings. Let's start with the compass bearings.



Let’s review how to obtain a bearing from a map:

Draw a line on the map for your intended travel route.

Line the compass up with the line, point the direction of travel for the compass in the direction you want to travel.



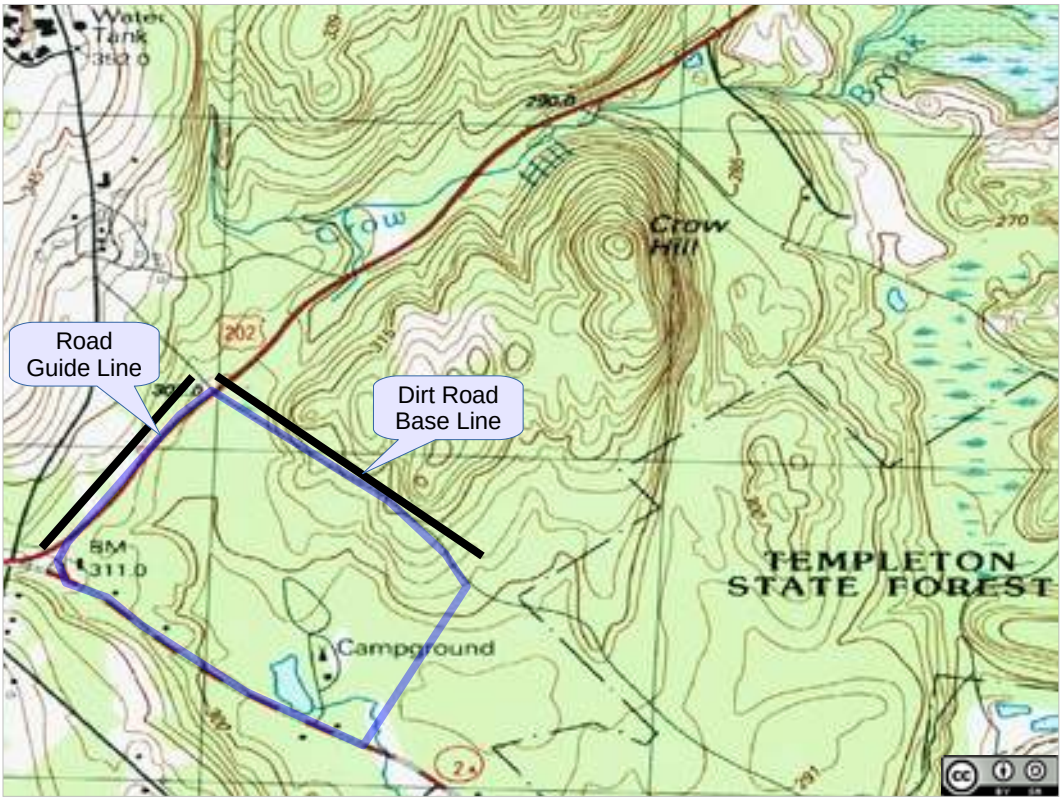
Line the lines in the back of the dial up with the grid lines on the map.

Make sure that the north arrow on the dial is pointed to north on the map (ignore the north magnetic needle).

Read the bearing off the compass. (true or magnetic?)

Here, 60 degrees true (there's a declination dialed in (how can you tell?)). (What's the declination?)

What is the backbearing?

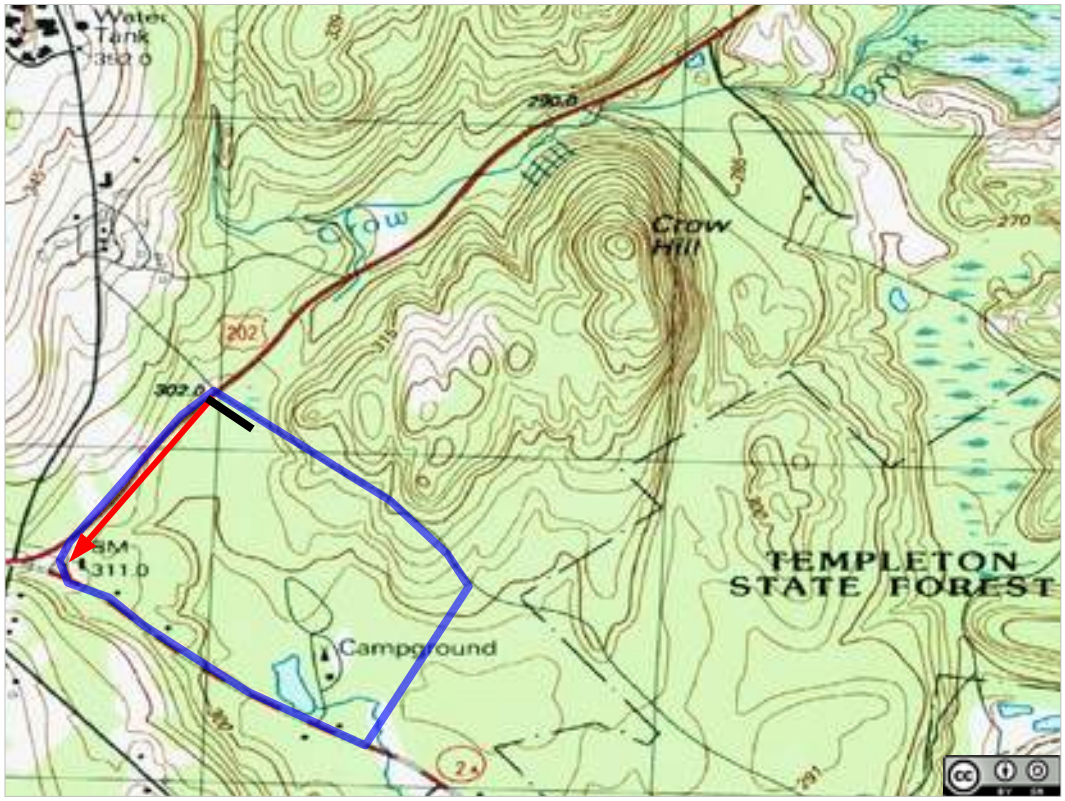


Here we have a Segment, and an Assignment: grid this segment with with a Type III grid.

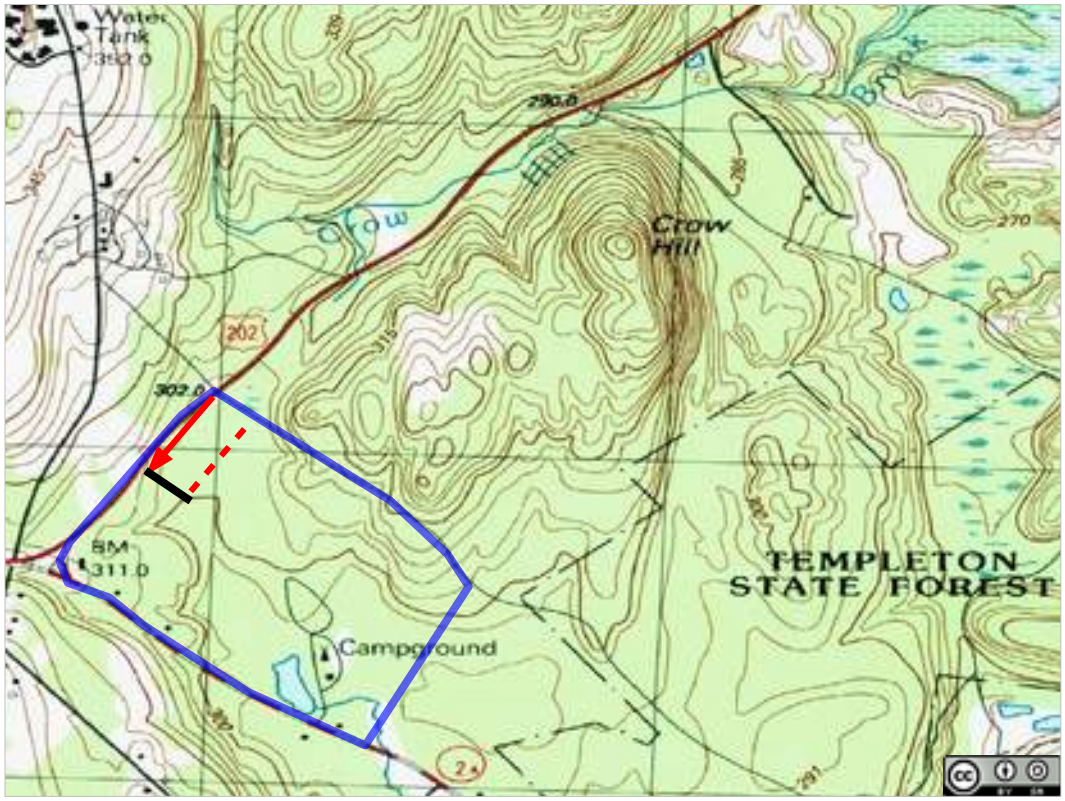
First, look for boundaries that are visible on the map and should be on the ground (a good search manager will look for segment boundaries that can be found on the ground (not grid lines or political boundary lines)).

How many firm boundaries does this segment have? (3)

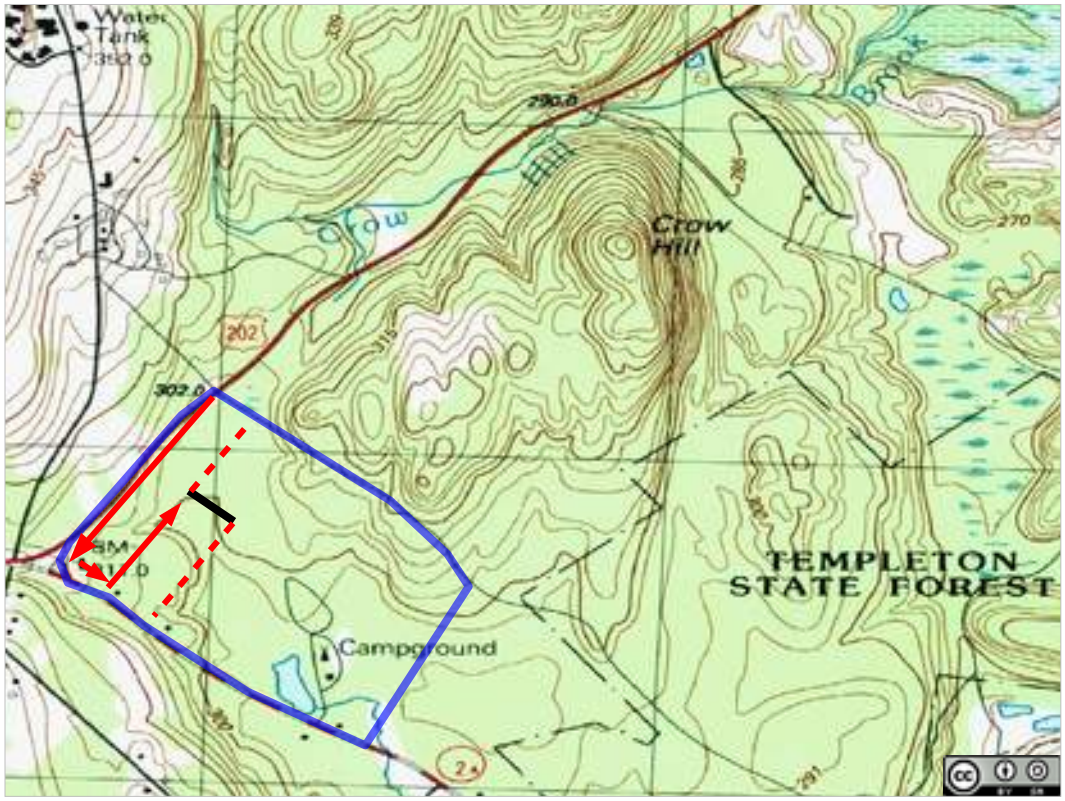
You have a clear guide line – the road down the West boundary of the segment, and a clear base line, a dirt road on the North boundary of the segment, and a clear far boundary, the road along the South end of the segment.



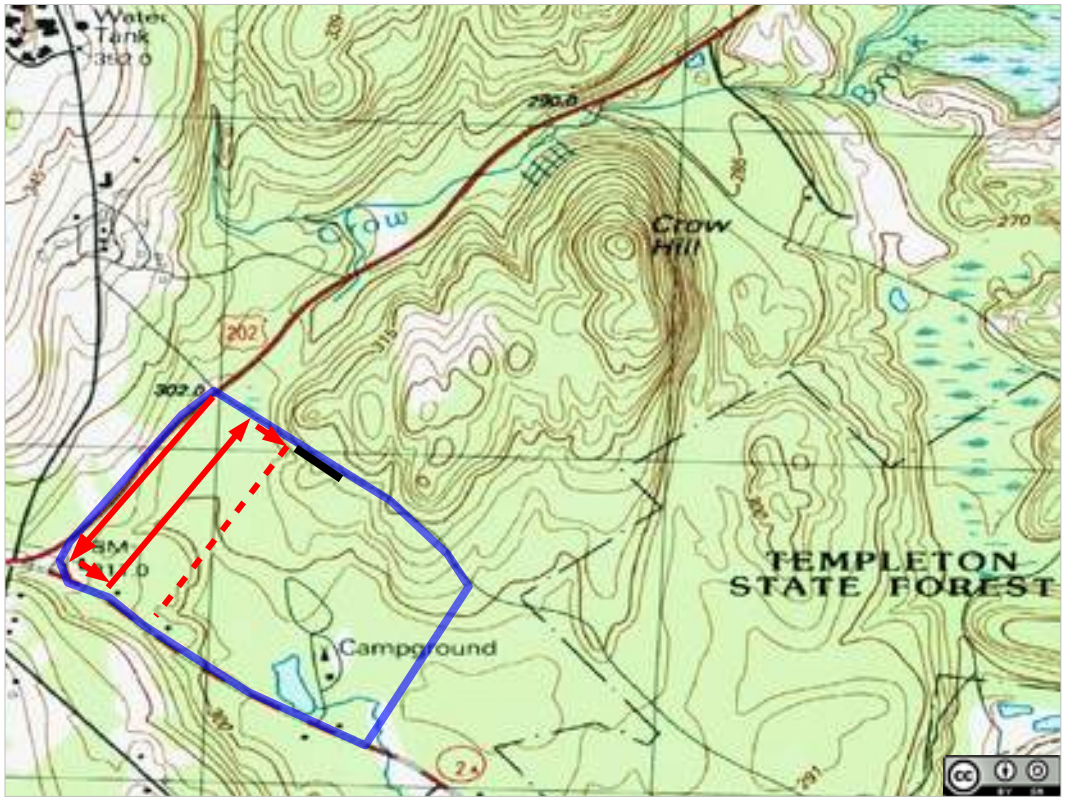
Searchers can start lined up along the dirt road base line, navigating off a guide person along the road.



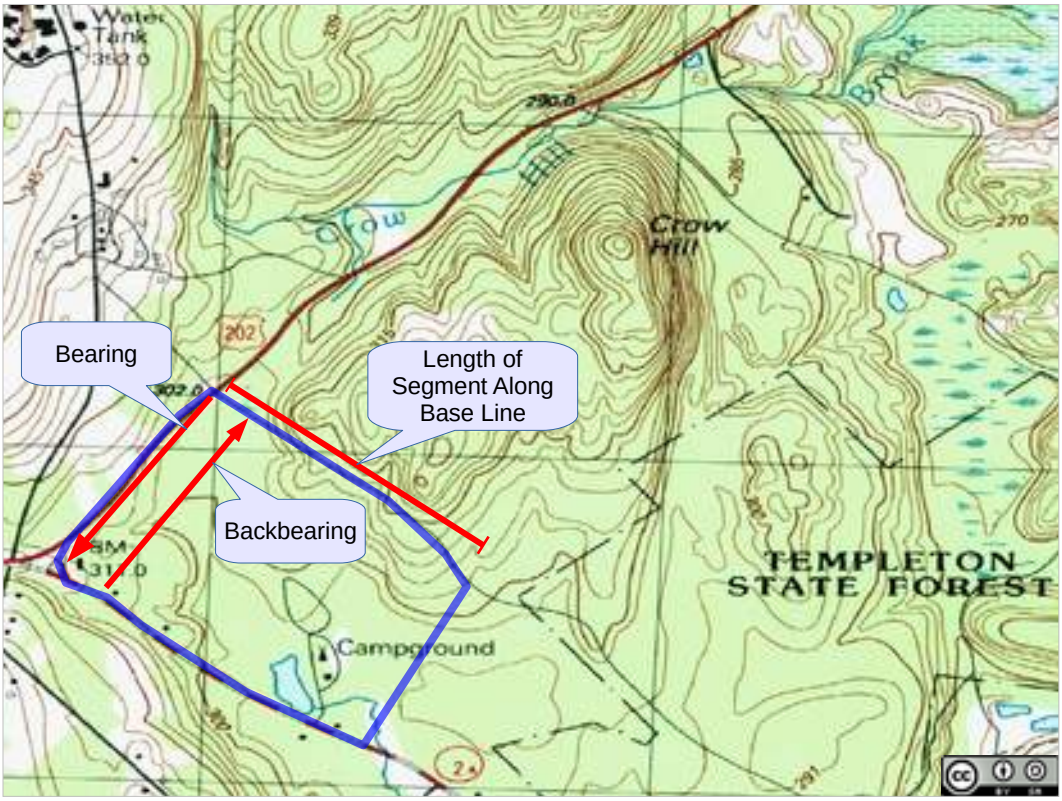
As the grid line advances, someone at the East end of the line can be tasked with flagging the line that will become the guide line for the next sweep.



When the grid line reaches the far boundary, shift over to the next sweep, and start back, the guide person following the flagging as the guide line.



And repeat.



To navigate this well bounded segment, you need three pieces of information: Which are?

How far down the dirt road is it from the start point to the end of the segment? What is the bearing for gridding South from the base line? What is the backbearing for gridding North back to the baseline?

For a Type II grid where everyone has a compass in their own lane, everyone would need both bearings to navigate.

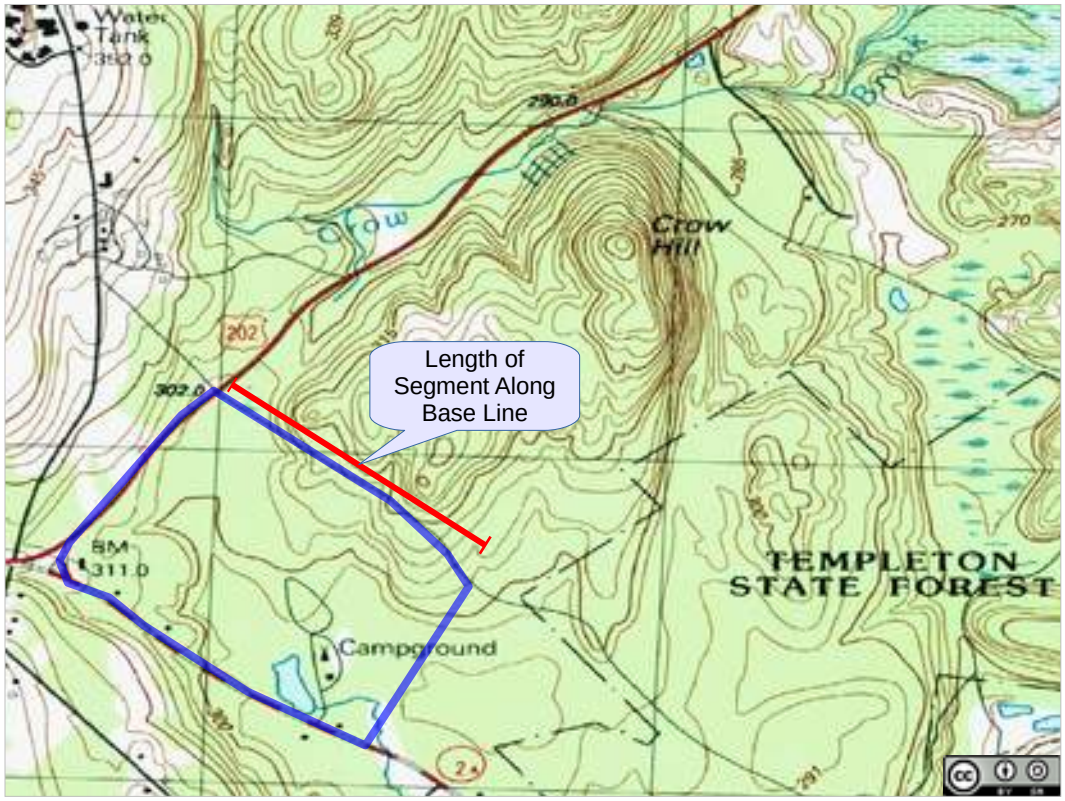
For a Type II grid or a Type III grid that is navigating by distance from a guide person, the guide person has the road and flagging guide lines to work from, but needs the bearings as a backup (what if they can't see the next flagging) and as a sanity check.

So, measure bearings with compass, and distance against the map scale.

So, let's measure those bearings and distances.

Practical Evolution 1: Measure bearings and distances for Segment 1 on map.

(Measure distance of base line along N segment boundary. Measure bearing along guide line and calculate backbearing.)



How far is it down the dirt road on the north end of the segment from the NW segment corner on the road to the NE segment corner?

How do we measure this distance on the ground?.

How do we know that we have reached the end of the assigned segment?

How Far?

- How do we know we've walked 800 meters on the ground?

Pace counting.

Measure out 100 meters (with tape measure or rangefinder). Mark start and end points.

Walk it, counting paces (number of times one foot (e.g. left) hits the ground).

Typically 60-70 paces to 100 meters.

Repeat.

Repeat at different locations on different terrain.

Key: Walk with constant stride.

To count paces, pick a foot. **Each time that foot hits the ground add 1.**

Typically around 60-70 paces in 100 meters, but people vary.

Measure paces in different ground covers – open, brush, snow, and different terrains (flat, up hill, down hill).

Keys to accurate pacing:

Try to maintain a constant stride length.

Keep track of your pace count (tally counter, ranger beads, etc.

To use ranger beads – count some number of paces (e.g. your paces in 100 meters), then move a bead and start counting over from 1. When you stop, state your pace count out loud and then write it down before doing anything else.

How about this segment?
Only one marked boundary.
Everything else needs to be done by compass and pace count.

How do you navigate this? [Discuss]

How do you know where to start?
What landmarks tell you you've reached the N segment boundary?

Practical Evolution 2: Measure on map.

Distance from a landmark to a starting point on the base line.
Distance along base line. Distance from base line to N segment boundary.
Bearing N from base line, backbearing from N boundary back to base line.
Bearing along base line/N segment boundary.
Identify landmarks near NW and NE segment corners.

You've measured bearings on the map. Now how do you travel on those bearings on the ground?

To travel on a bearing (with a baseplate compass).

Set the dial to the desired bearing (at the direction of travel end of the compass).

Then sight on the furthest thing you can clearly recognize on that bearing:

Hold the compass up at eye level.

Line down the middle of the compass passes through the pivot point of the needle.

Hold the compass level, turn right and left to make sure the compass needle swings free.

Turn so that the red end of the compass needle falls in the red “shed” box on the dial. (with a lensatic compass, you’d need to turn so that the magnetic bearing is in the direction of travel)

Identify the furthest thing you can clearly identify in the compass sight.

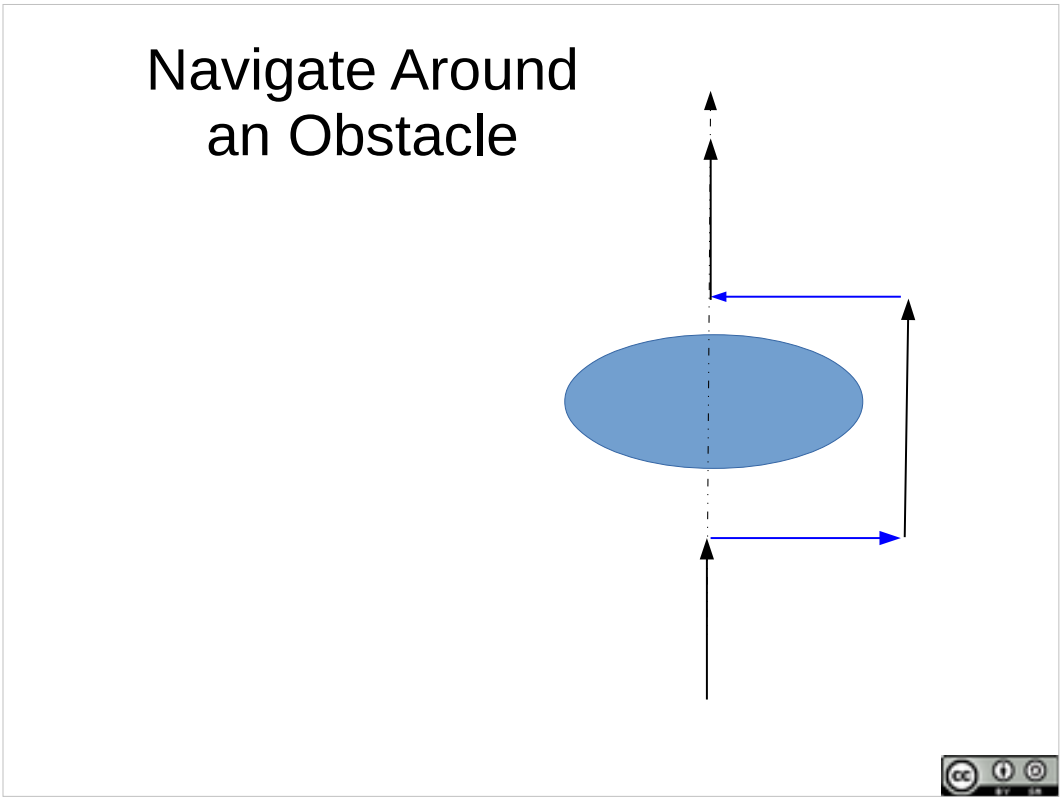
Then put the compass down, make sure you can still identify the thing you saw down bearing, and start pacing towards it.

When you get to that thing, repeat. Continue, repeating sighting on a distant object and walking towards it until you've paced out your distance of travel.

Ranger beads or a tally counter very handy to keep track of distance.

Ranger Beads: Move one bead for each 100 meters (e.g. 65 paces – you only need to keep track of numbers up to 65).

Move your 5th bead, you've traveled 500 meters...



To navigate around an obstacle

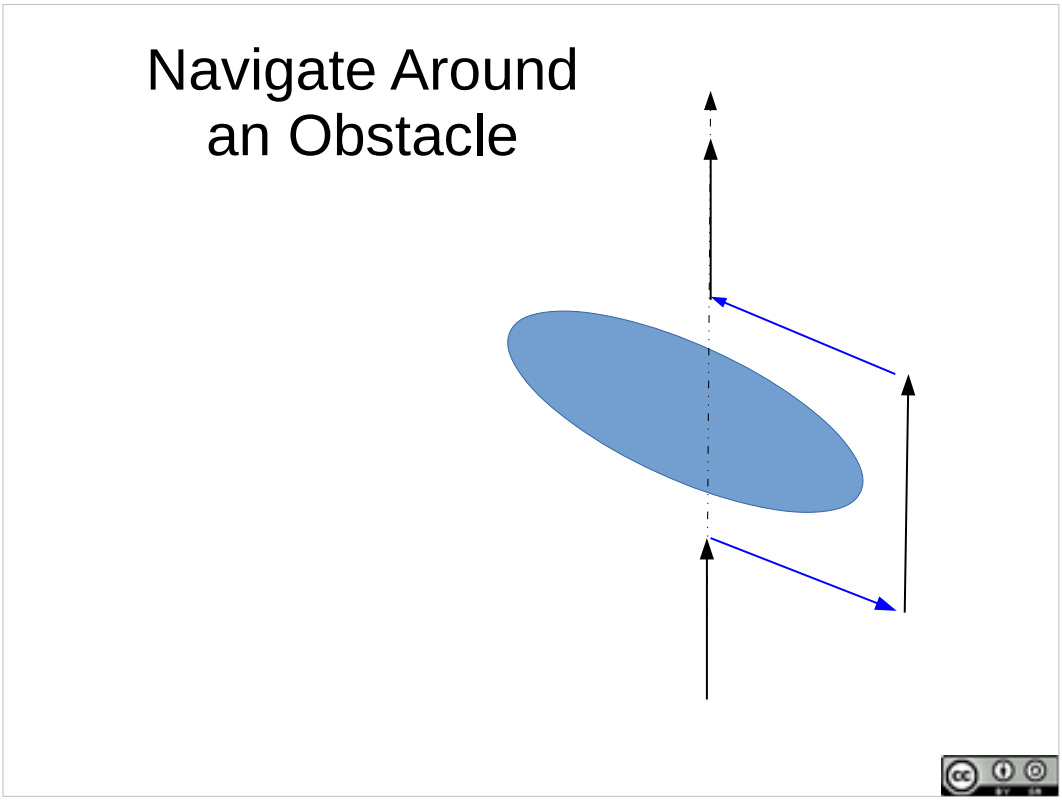
(Stop, write down your current pace count (draw a picture, write numbers on the picture)).

Pace a leg out on a bearing that takes you beyond the obstacle (count paces, but don't add to total distance traveled).

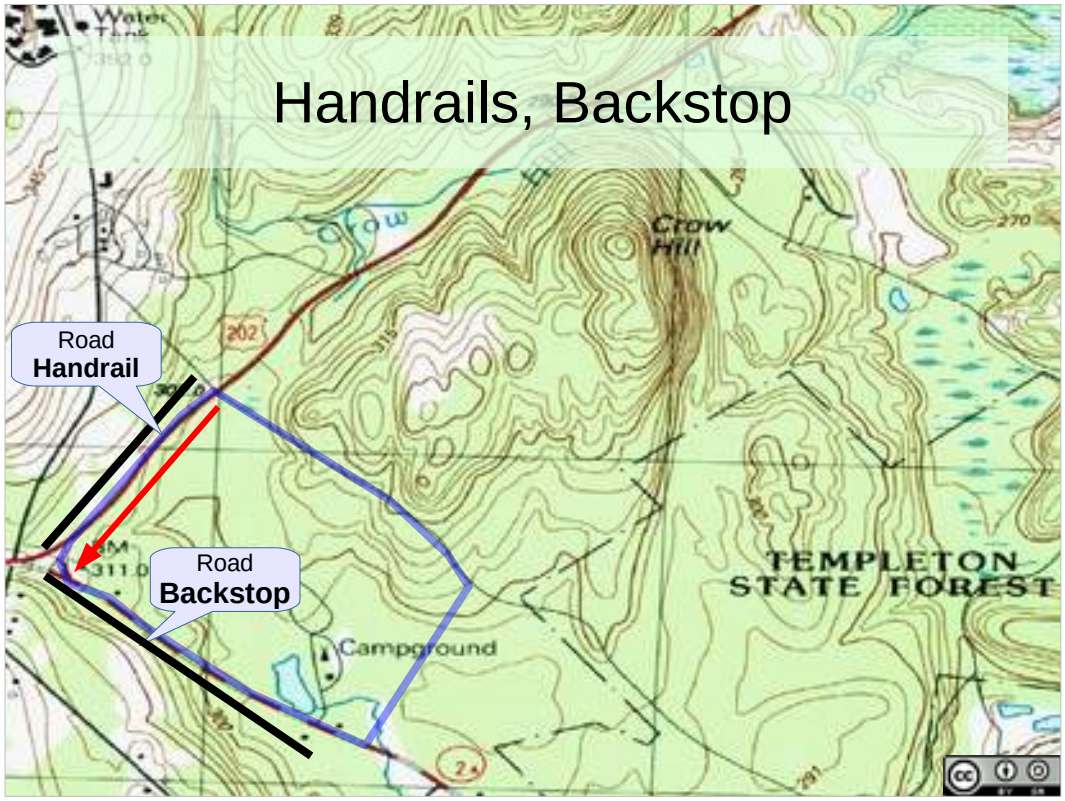
Pace on your original bearing past the obstacle (adding the distance paced to your total distance traveled).

Pace a leg back (the same distance you came out) on the back bearing of your first leg around the obstacle (don't add this distance to the total distance traveled.

Now you are back on your original bearing, continue.



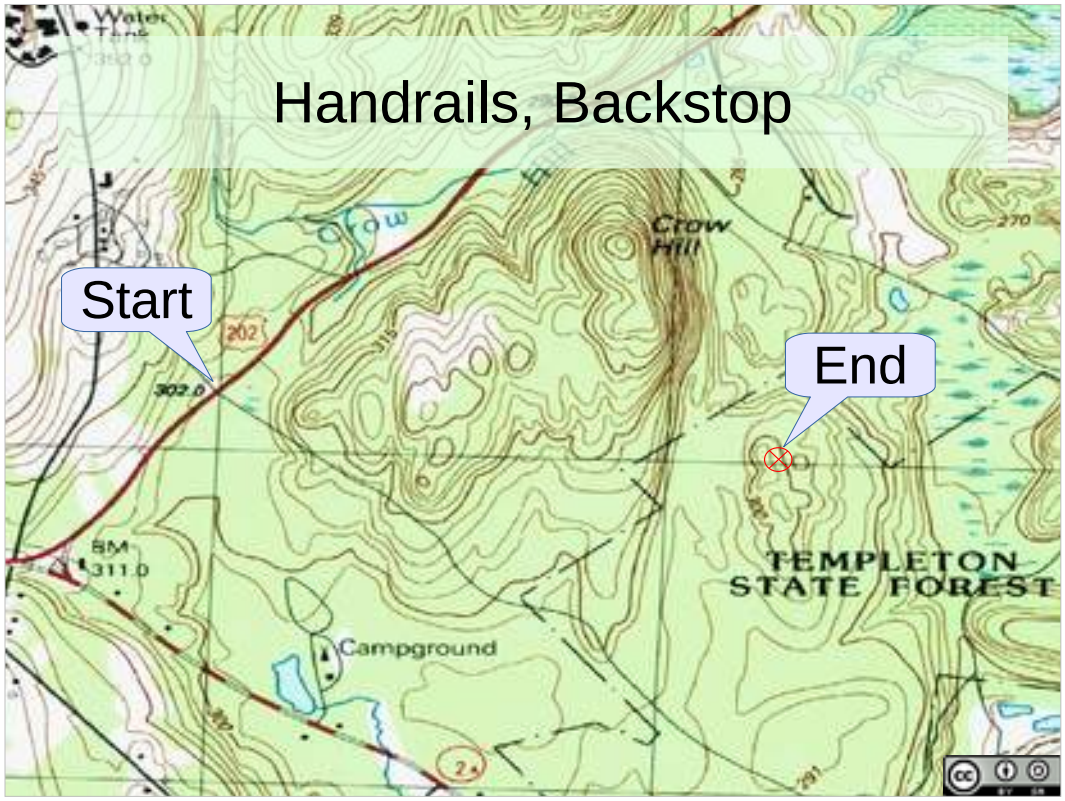
The side legs out around the obstacle and back don't need to be at right angles to the direction of travel, they just need to be the same distance on a bearing out and the backbearing back to the line of travel.



When navigating the terrain, try to use a handrail – some terrain feature that you can follow along, and a backstop – some terrain feature that when you reach it you know you have reached the distance you want to travel (or have gone too far).

Here one road serves as a handrail for the first grid line, and a the other road as a backstop for the end of that gridline.

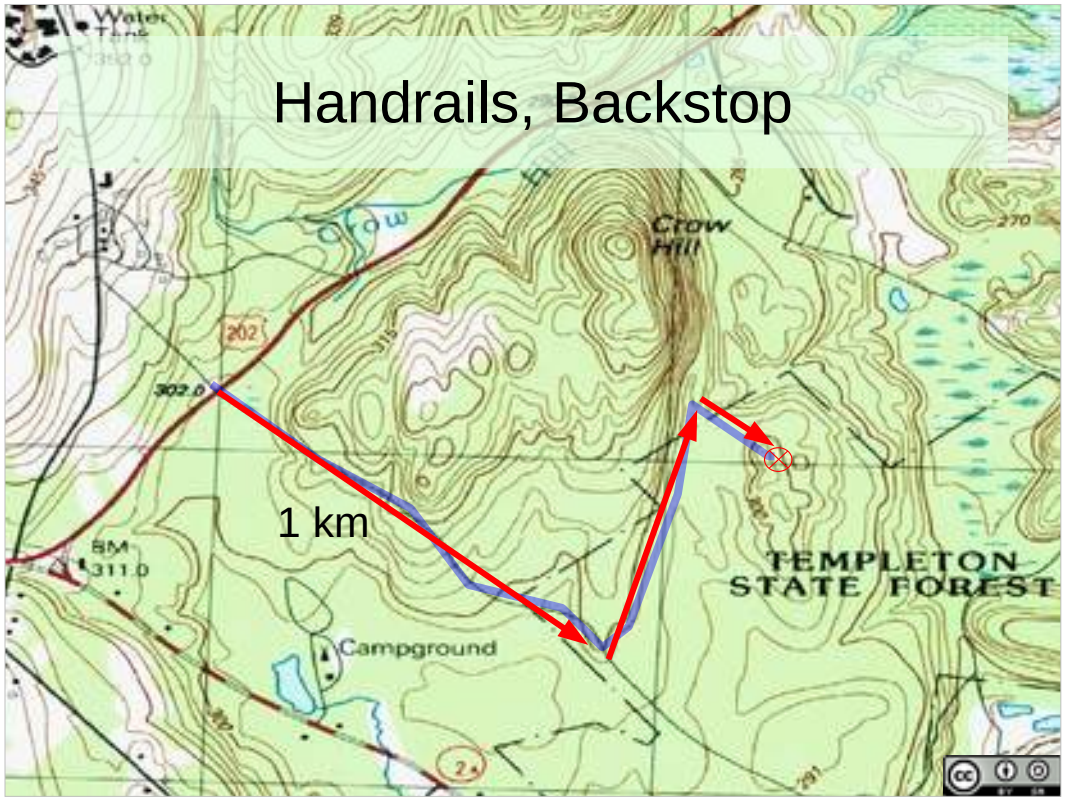
What will you use as a handrail for the next grid line? (flagging tape)



Use handrails and backstops when navigating through the terrain.

Here's a dropoff point and an IPP.

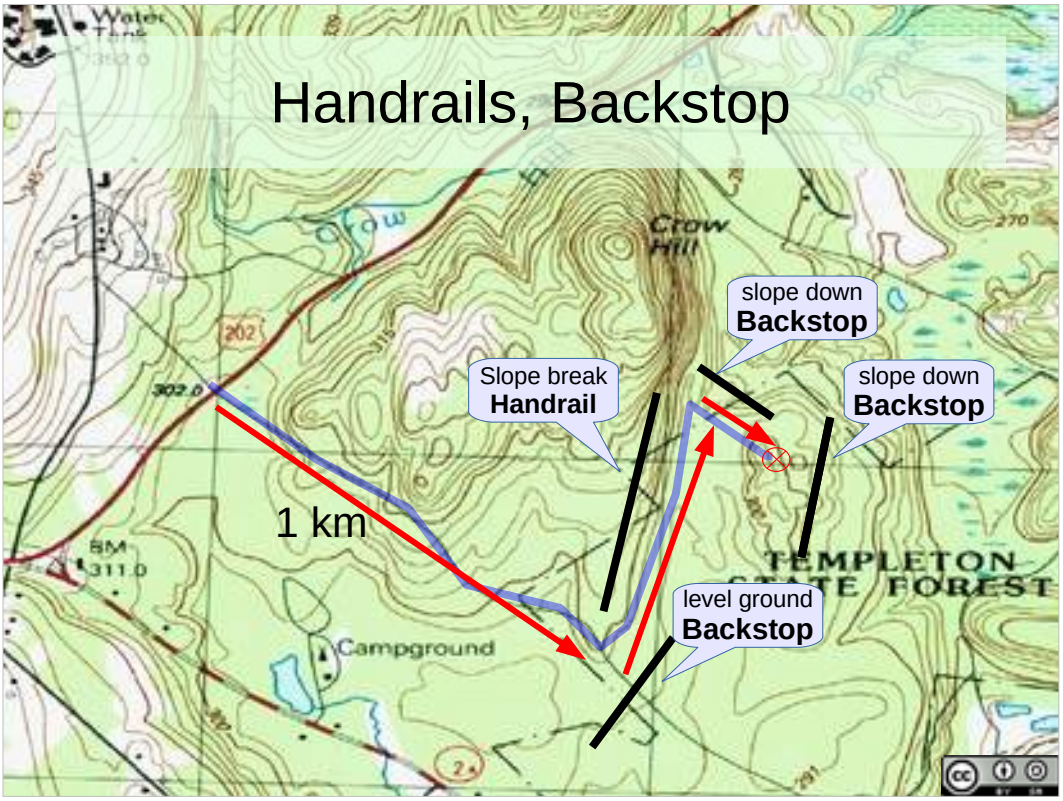
What terrain features can you use as handrails and backstops to plan a route that can reliably get you to the IPP, even if you make errors in your bearings and distances (or even use to navigate to the IPP from just the terrain)?



Here's a route using handrails and backstops.

To get to the IPP, go 1 km down the dirt road, then 500 meters North, then 200 meters East.

What terrain features can you use as handrails and backstops on this route?



Go down the road 1km (pace counting), near the end down into a valley then up a small hill – level ground after that is your backstop.

Then travel along the edge of the slope break (handrail) about 500 meters until the ground drops in front of you (backstop), then about 200 meters to the crest of the small hill – ground dropping off to the swamp is your backstop.

Practical Evolutions:

(3) Establish Pace Count for 100 meters.

(4) Navigation on bearings on an equilateral triangle with 100 meter sides, returning to the starting point.

(5) (Optional) Navigate on assigned bearings to marked targets, report distance traveled.