



Unit 10: Tracking/Mantracking/SignCutting
Date Last Updated March 3, 2020

This presentation Copyright © 2014, 2020 Paul J. Morris, Dale N. Chayes Some Rights Reserved.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. This material may be freely reproduced and used under the terms of the Creative Commons Attribution-ShareAlike License.

This presentation includes images that have been made available under CC-BY and CC-BY-SA licenses, and material from the public domain.

This presentation is not a complete manual for search and rescue response. The materials are not meant to replace field training by competent search and rescue leaders or to replace actual experience. NEWSAR and the authors and contributors do not endorse any specific equipment mentioned or shown in this program. The authors, contributors, and NEWSAR take no responsibility for the use of this guide or the information contained within. The authors, contributors, and NEWSAR take no responsibility and cannot be held liable for statements made by instructors who use this presentation. It is the duty of every community, organization, volunteer group, and agency, to obtain the knowledge, skills, and proficiency to perform and maintain effective search and rescue management and operations. The information presented in this presentation serves as part of a beginning outline and body of knowledge for proper search and rescue programs at the community level.

A course presented using this material may only be represented as a NEWSAR course, and may only use NEWSAR marks if presented by an authorized NEWSAR instructor under the auspices of NEWSAR. No authorization for the use of NEWSAR marks is given or implied by this document.

What is "Tracking"

- Locard's principle: "...you can't move through an environment without changing stuff...."
- Following a subject's "sign" (changed stuff)
 - Step by step "man" tracking
 - Signcutting/Tracking/Mantracking/Visual tracking
 - Signcutting = mantracking/tracking/visual tracking
 - Signcutting = trying to acquire a track
 - Signcutting = jump tracking

Dr. Edmond Locard (1877–1966): formulated the basic principle of forensic science as: "Every contact leaves a trace" e.g. "you can't move through an environment without leaving sign behind"

Various names for a person following a sign left by a person, tracking, visual tracking, mantracking, signcutting.

Signcutting is a common name – but has multiple meanings.

[ASTM 2209-14 expects knowledge of "12.11.2 The difference between sign-cutting and tracking." This depends on who you talk to, definitions are inconsistent.]

Changed Stuff

- Sign
- Track
- Print

Sign – what is it? Any evidence of passage.

What is a print?

What is a track?

[ASTM 2209-14 expects knowledge of "12.11.1 The difference between sign and tracks."]

Tracking in SAR

- **Preserve sign**, particularly at LKP/PLS/IPP and along trails
 - **Locate Staging, IC, etc. elsewhere**
- Trackers can establish direction of travel
 - dramatically reduce the high probability search area
- Really good trackers can move faster than the subject
 - They are very rare but a great resource

Step by step tracking is:

- a craft that takes hundreds to thousands of hours to get "good" at
- a perishable skill

Critical for all searchers is awareness that sign exists, and actively acting to preserve sign.

The "right" sign?

- There (nearly always) sign all over the place!
- The "right" sign will be:
 - In the "right" place
 - At the "right" time (age)
 - Doing the "right" thing

There is nearly always sign all over the place.

Is the sign in the right place?

Can aging get you to the right time (of day/date)?

Does the sign support the plausible action(s)?



A print, observed in the early morning.

Notice the very clear impression of the lugs in the sole from the heel of the footwear, and the dark shadow from the soil pushed up by the side of the heel.

Note the broken piece of plastic at the bottom of the picture.

[Don't spend too much time looking for details in this image, point is comparison with the next image.]

Next slide is the same print from a different angle, in this slide, the photographer is facing towards the sun.]

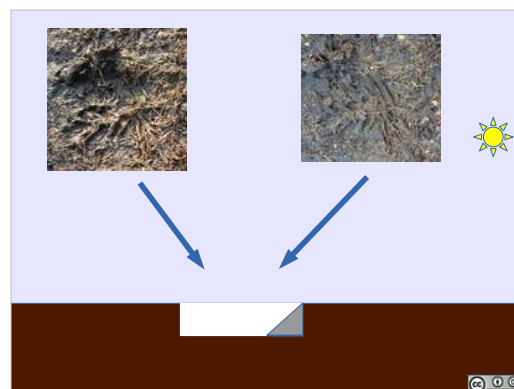
Unless otherwise noted, all images include in this presentation are Copyright © 2014 Paul J. Morris Some Rights Reserved. CC-BY-SA.



The same print, observed from the other side, the broken plastic is now at the top of the picture.

The sun is at our back, shadows from the print are much less evident.

[This is the same print as the previous slide, taken at the same time, just from the opposite direction, with the sun at the photographer's back]



Lesson 1:

Angle of illumination is critical for observing sign.

Use Sun Angle

- Tracking is easiest when the sun is low (morning and evening).
- Keep the tracks between you and the sun.



Tracking (with some exceptions) easiest when the track is between you and the light source.

Sign

- Flattening
- Regularity
- Color Change
- Disturbance



Elements of sign that you can observe



You can see disturbance (disturbed pine needle), flattening, regularity (straight lines from the tread, straight line from the side of the sole), and color change (transfer of mud onto the leaf).

[Note: Sign is notoriously difficult to photograph. Do not spend too much time trying to identify all of the sorts of sign in each of the images that follow, each picks out a particular aspect, focus the students' attention on just that aspect, seeing all of the myriad details should be left to practical evolutions. Do not take time to identify heel, toe, and other structures in each image, just focus on the single clear aspect.]



Center of the image shows an area which is much flatter in comparison to the surrounding background.



The tracklayer's weight impressed these pebbles into the ground – they have a dark halo and cracks in the soil around them.



An impressed twig. Again, a dark halo.



Regular wavy pattern from tread on the sole.



Here is regularity from the tread pattern and color changes in the mud.

What sort of footwear is this?

Trick question – you can't tell. All sorts of different tread patterns are put on all sorts of different footwear. Size also is very variable, shoe size has only a weak correlation to length of the print.



Here is color change and transfer from transfer of salt from a salt rich puddle of melting slush on the road side to cleaner pavement. Dark is salt retaining moisture, white is dry road salt.

Can be very durable tracks in urban environments.



Here we have a boundary between mud and asphalt pavement.

A tracklayer walked from the mud onto the asphalt.

Scale bar is at a location we'll look more closely at in the next couple of images.



Looking closer – there's a print in the mud – some mud got stuck on the sole

And on the asphalt, some of the mud got left behind.

Transfer.



Transfer, later when the pavement is dry.

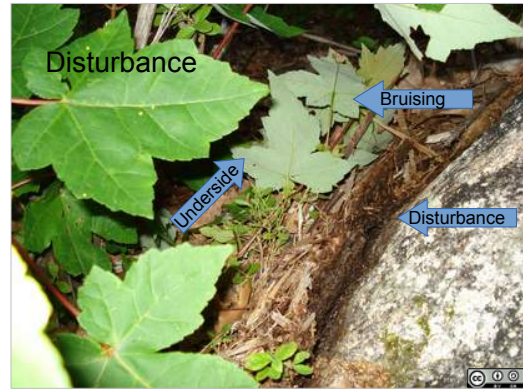
[Same track as the previous slide, later in the same day, transfer remains, clearest as patch of brown dirt on asphalt, left top center.]



What can see here?

Scrape marks on the stick where frost was scraped off.

Mark where stick was frozen on the ground and has moved.



Check things that people would step over. Top often has scrape marks. Place where they put the foot down on the far side often has disturbance from lots of force.

See also bruising on bottom of overturned leaves.

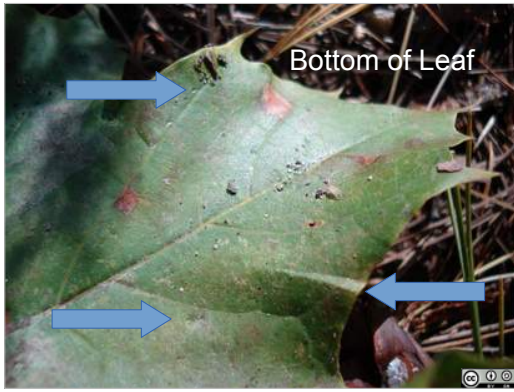


Dry leaves crack when stepped on.

This is one tool for aging sign, the edges of the crack draw back over time.



Older cracks dry and spread apart.



Examining the bottom of a leaf that has been stepped on may reveal more sign than the top.

This image shows transfer of dirt from the ground onto the bottom of the leaf, bruises in the leaf, and a linear feature where the leaf was folded.

What do you know about the sign?

- Conclusively Human
 - Identifiable as the subject's tracks
 - Made: Identifiable and describable
 - Definitely human sign
- Possibly Human: Corroborant sign

Sign might be identifiable as made by the subject, identifiable, definitely human but not identifiable, or possibly human.



What do we see?

[Spend some time examining this image.]

[Students should be able to see at least: regularity, flattening, impressed pebbles, disturbance]

What do we know about this sign?

Definitely human, may not be identifiable.

Look for sign in three dimensions

Sign isn't just on the ground.



Horse Trail crossing Evansburg Creek
Evansburg State Park, PA

Branches over trail.

Good place to check for sign above the ground.

Indeed: Horse hair in branches over trail



Here is the horsehair on leaves above horse crossing

Evansburg Creek
Evansburg State Park, PA



Track in pine needles.

Challenging to see. Popsicle stick marks the heel, rest of print is in focus.

[This image is context for the next two.]



There was a broken twig in the track.



At shoulder height, here's where that twig was broken off in the tracklayer's passage.



Dry tall grass disturbed by passage
Penhurst State School, PA

Flags are marking a line of prints.

Tall dry vegetation is broken.



Footprint in tall grass
Penhurst State School, PA

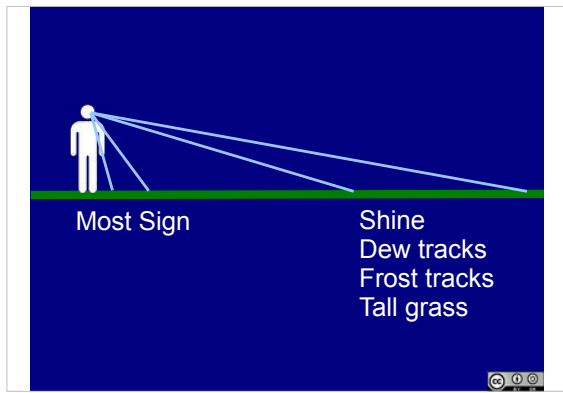


What do we see?

Tracks in dew.

Will these last?

Where can you see them best?



Most sign is best seen close to you, with the sun backlighting it at a low angle.

Some sign jumps out at you from a distance, and may be seen best with other angles of illumination.



Track Traps: Natural or created.

You can create them.

Watch for natural track traps, check them for sign, avoid trampling them.

Dirt time

- Tracking step by step
- Tracking Stick
- Drawing and Describing Tracks
- Observing behaviors
- Watching sign age

Learning to track involves teaching your brain to observe sign.

Very time intensive, needs lots of dirt time.

Some steps in the process – learning to observe changes to behavior in the track and learning how sign ages in your local environments take lots and lots of time and practice.

NEWSAR usually has tracking opportunities at the annual training.

NASAR has a tracking course.

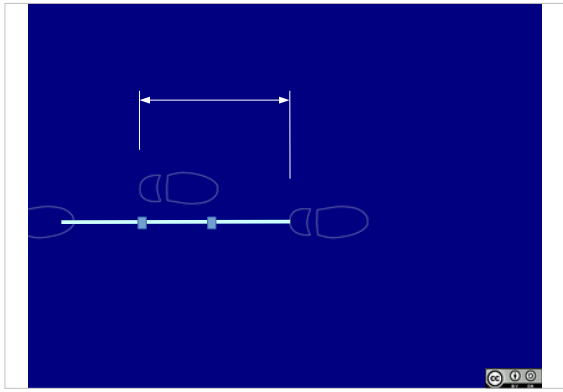
VA Field Team Signcutter course is a week.

Tracking Stick

- Mark with print and stride measurements
- Focuses your attention when tracking step by step.

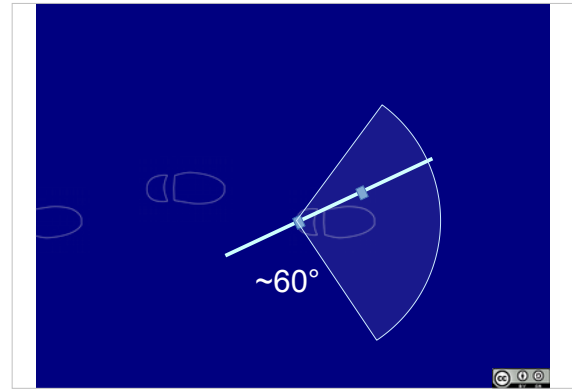


A tool that can help you track is a tracking stick.



After you have measured a track with a tape measure and written down the measurements, you can set up your tracking stick as a quick reference.

Using rubber bands, etc, you can mark out stride length (e.g. heel to heel) and print length on the tracking stick (and other measurements as well).



Marking heel to heel, you can hold the tracking stick at the heel mark of the most recent print, swing it side to side over a 60 degree arc, and focus your attention just in front of the tip of the stick – this is where the next print should be.

Very important for learning is Tracking step by step, don't move on until you've found the next print.



What do we see?



Tracks can also tell you about the subject's behavior.

What is going on here?

Search Crucials

- Search is an Emergency
- Search is a classic mystery
- **Search for clues not just the subject**
- **Know if the subject leaves the search area**
- **Close grid search as a last resort**
- Manage by objectives
- Search management is information management



Humans leave about 2000 clues per mile.

We are searching for? Clues and the subject.
Discuss crucials.

Out of Koester's bicycle wheel model, what locations and actions particularly relate to sign? Axle-PLS protect it to preserve clues (including sign). Resources to determine direction of travel to area around the PLS.

Very typical problem at the PLS is contamination – plenty of sign in addition to the subject from family, friends, initial responders, and searchers.

A typical issue for a mantracker is distinguishing the subject's sign form contamination.

Supporting a Tracking Task

- Stay behind.
- Stay situationally aware.
- Look ahead.
- Look for Clues.



When working with a tracking task, don't want to contaminate the sign the mantracker is working.

Don't get into the mantracker's light or get ahead and disturb sign.

The mantracker is focused on the sign. You need to look at the big picture and maintain situational awareness. Look for what's ahead. Look for hazards. Look for clues.



This presentation Copyright © 2014-2020 Paul J. Morris and Dale N. Chayes
Some Rights Reserved.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. This material may be freely reproduced and used under the terms of the Creative Commons Attribution-ShareAlike License.

This presentation includes images that have been made available under CC-BY and CC-BY-SA licenses, and material from the public domain. Attributions are noted on individual slides. These contributions to the commons are very gratefully acknowledged.