

MANITOBA ENVIROTHON

FORESTRY EQUIPMENT USAGE

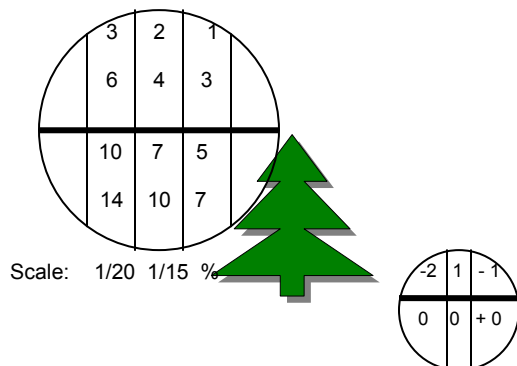
Why Measure?

- Forest growth, stand development and health monitoring
- Site productivity measurements
- Permanent sample plots (PSP) using repeated measurements on same trees over time allow growth calculations
- Calculated volume for harvest
- Standardized measurements using easy to use and carry equipment
- Dendrochronology – Tree-Ring databases, long-term climate studies

Height Measurements (Clinometers):

- Suunto is most common
- Also Haga, manual methods, laser rangefinders
- Most use theory of right angle triangles to calculate height based on hypotenuse
- Require distance from object

View through eye-piece of SUUNTO clinometer:



Technique for SUUNTO:

- Measure distance to tree (this example will use the 20 (left-most) scale)
- Look through eye piece, ensure you are holding so you can read numbers and choose appropriate scale (look straight up, scale is at bottom of numbers)
- Align horizontal bar with top of tree, record reading = about 9
- Align horizontal bar with bottom of tree, record reading = about -1
- If your eye level is above the base of the tree, add the two numbers.

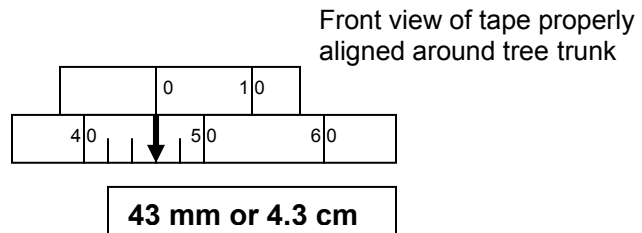
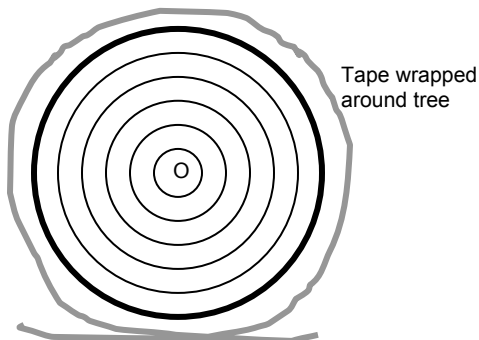
From picture, example:

Top = 9, bottom reading = -2

Total Height = $9 + 2 = 11$

Diameter Measurements (Tapes, Calipers, Rulers):

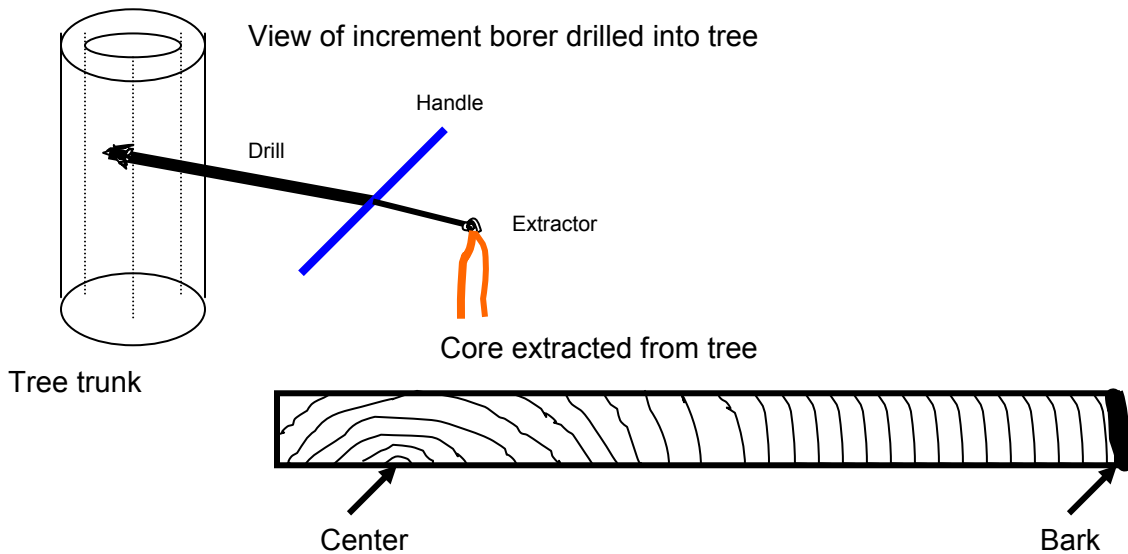
Top view of tree trunk cross-section



Technique for Diameter Tape:

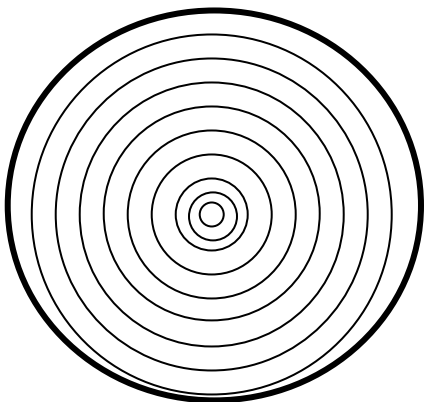
- Use side of tape which reads: **CIRC. TO DIA. π mm**
- Wrap tape around tree, at standard height above ground (1.3 meters = Breast Height)
- ensure it is horizontal and no obstructions on stem like branches, etc are affecting it
- Pull tight, read number below 0, this is the diameter, from above example = 4.3 cm
(Note: Tape is graduated into tenths of millimeters)

Age Determination (Increment Borer) :



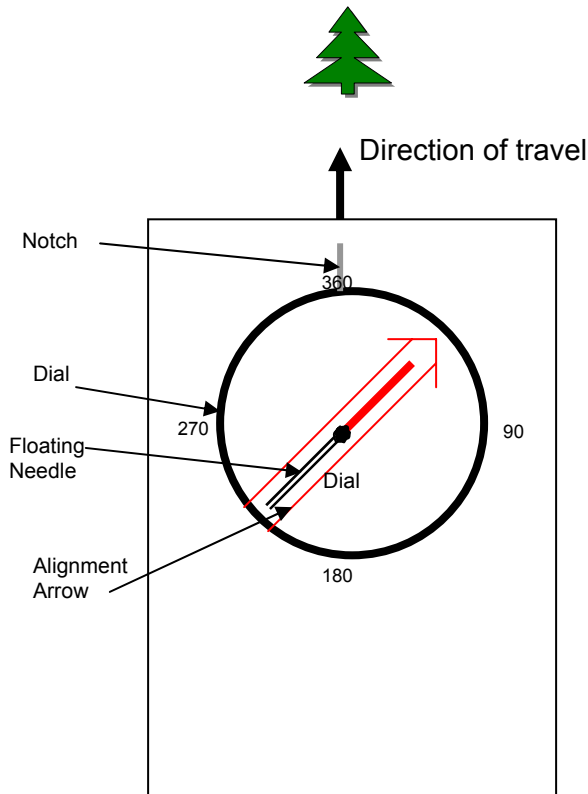
Counting Tree Rings:

- Can be done from cut logs, stumps, cookies, etc
- Use increment borer to extract cylinder of wood from living tree
- Bore into tree ensuring borer is horizontal and will pass through center and slightly beyond at standard height above ground (0.3 meters or length of borer handle)
- Insert extractor and remove core
- Count rings from center to bark (if center not visible re-bore)
- Use water to wet rings for better visibility and hand lens if rings very close or hard to see
- Example tree is 26 years old



Tree Cookie

Location Determination (Compass, GPS) :



Compass Technique:

- Ensure declination is properly set (It is provided on most NTS maps)
- To head North (360°) as in diagram
- Turn large dial until desired azimuth 360 is under notch
- Hold compass flat and level so that floating needle float freely (beware wearing too much jewelry or being near large metal objects)
- Turn body and compass until floating needle lines up with large arrow on compass dial
- Pick an object in the distance in line with the notch and walk towards it
- Re-sight as necessary until object is reached
- Can be used in to calculate what azimuth a certain object is from user by reversing technique. (Stand with notch pointing at object, turn compass dial until red needle and arrow are aligned, read off azimuth at notch.)

- GPS or Global Positioning System is very useful tool to find the co-ordinates of an exact spot on the earth or to navigate to a set location. It is also used to track the path or route of vehicles or animals. When information from a GPS source is used with GIS or Geographic Information Systems map or tabular data, many useful analysis or studies can be performed.