

Sample Plots



FOR 1001
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Today's Objectives

- ❑ Concept & role of sample plots
- ❑ Plot calculations
- ❑ Plot establishment

You will establish plots & measure trees to address your *first case study*

Sample Plots

What?

- Plot is:

An area of land, representative of larger area of land, in which trees or other features are measured.

- We apply what we measure in the plot to larger area of land it represents.

Sample Plots

Why?

- ❑ Remember, to get meaningful information for a forest, we need to *scale up* from:

tree to stand to forest

- ❑ Sample plots help us take the step from tree to stand

Tree → Stand → Forest

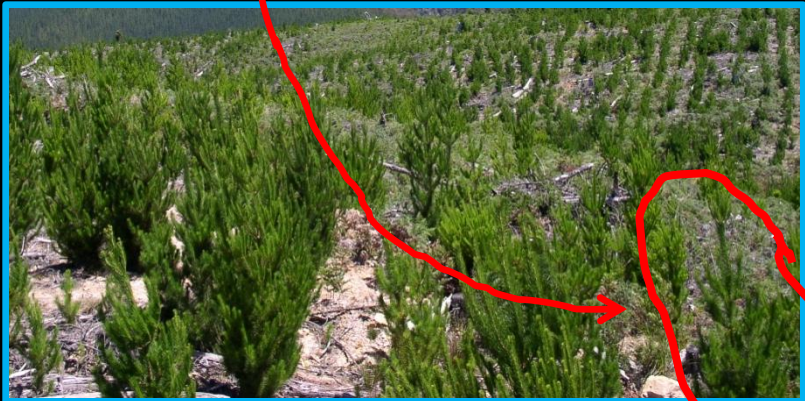
Stands

Trees



Forest

Stands



Sample Plots

How Used?

- ❑ What if the area of interest is:
- ❑ 100 ha?
- ❑ 10 000ha?
- ❑ Even larger?

- ❑ Our area is of interest is a stand 1ha in size

How many trees does it contain?



Sample Plots

How Used?

- ❑ We establish a plot 10m X 10m
- ❑ $100\text{m}^2 = 0.01 \text{ ha}$
- ❑ We count **15 trees** in the **0.01 ha plot**
- ❑ How many trees in the **1 ha stand?**

$$\frac{15 \text{ trees}}{0.01 \text{ ha}} = \frac{X \text{ trees}}{1.0 \text{ ha}}$$

- ❑ Our area is of interest is a stand 1ha in size

How many trees does it contain?



Sample Plots

How Used?

- Our area of interest is a stand 1ha in size

How many trees does it contain?

- How many trees in the 1 ha stand?

$$\frac{15 \text{ trees}}{0.01 \text{ ha}} = \frac{X \text{ trees}}{1.0 \text{ ha}}$$

$$X \text{ trees} = \frac{15 \text{ trees} * 1.0 \text{ ha}}{0.01 \text{ ha}}$$

$$X \text{ trees} = 1500 \text{ trees}$$



Sample Plots

□ General Forms

How Used?

$$\text{per ha value} = \frac{\text{plot value}}{\text{plot size}_{(\text{ha})}}$$

$$\text{stand value} = \text{per ha value} * \text{stand size}$$

	<u>How Many Trees</u>	<u>How Much Volume</u>	<u>How Much Carbon</u>	<u>How Many Snags >40cm</u>
plot value	100 trees	40 m ³	80 tonnes	5 snags
plot size	0.04 ha	0.1 ha	0.01 ha	0.5 ha
per ha value	2500 trees/ha	400 m ³ /ha	8000 tonnes/ha	10 snags/ha
stand size	8.0 ha	20.0 ha	2.0 ha	12.0 ha
stand value	20 000 trees	8000 m ³	16000 tonnes	120 snags

Sample Plots

□ General Forms

How Used?

$$\text{per ha value} = \frac{\text{plot value}}{\text{plot size}_{(\text{ha})}}$$

$$\text{scale up factor} = 1 \text{ divided by plot size}$$

$$\text{per ha value} = \text{scale up factor times plot value}$$

Sample Plots

□ General Forms

How Used?

$$\text{per ha value} = \frac{\text{plot value}}{\text{plot size}_{(\text{ha})}}$$

$$\text{scale up factor} = 1 \text{ divided by plot size}$$

$$\text{per ha value} = \text{scale up factor times plot value}$$

Sample Plots

□ General Forms

How Used?

$$\text{per ha value} = \frac{\text{plot value}}{\text{plot size}_{(\text{ha})}}$$

$$\text{scale up factor} = 1 \text{ divided by plot size}$$

How Many Trees

plot value **100** trees

plot size **0.04** ha

per ha value **2500** trees/ha

stand size **8.0** ha

stand value **20 000** trees

$$\text{scale-up factor} = 1 / 0.04 = 25$$

$$\text{trees/ha} = \text{trees/plot} * \text{scale-up factor}$$

$$\text{trees/ha} = 100 \text{ trees/plot} * 25 \text{ plots/ha}$$

$$\text{trees/ha} = 2500$$

Sample Plots

□ General Forms

How Used?

$$\text{per ha value} = \frac{\text{plot value}}{\text{plot size}_{(\text{ha})}}$$

$$\text{scale up factor} = 1 \text{ divided by plot size}$$

How Many Snags >40cm

plot value

5 snags

plot size

$$\text{scale-up factor} = 1 / 0.5 = 2$$

0.5 ha

per ha value

10 snags/ha

stand size

12.0 ha

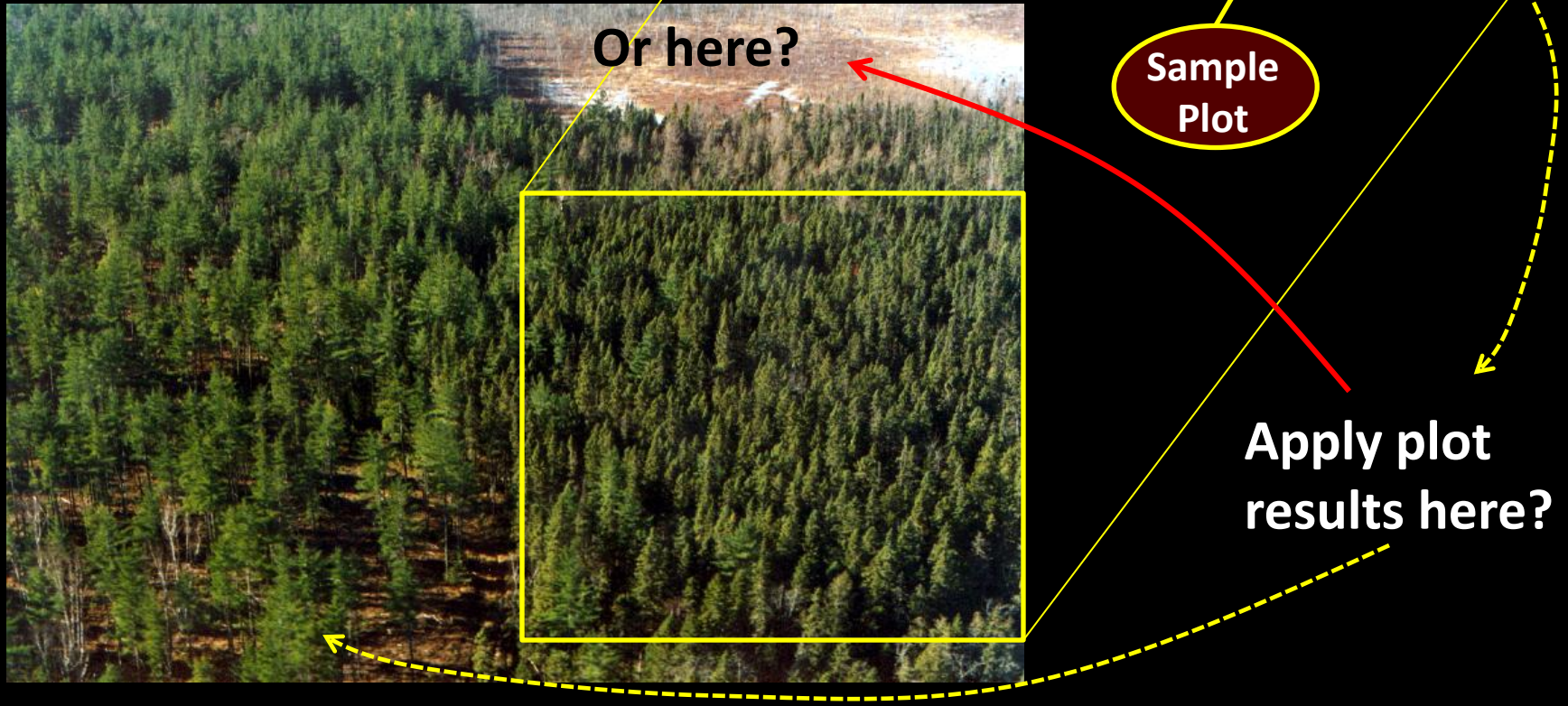
stand value

120 snags

Sample Plots

Remember!

- Conditions in the plot must be **representative** of the **larger area** to which sample results will apply



Sample Plots

How Established?

- Various shapes & forms
 - circular
 - rectangular or square
 - strip
 - “unbounded” (observations taken from a point)

Sample Plots

How Established?

- **Choosing size & shape**
 - **Ease of establishment**
 - **Area/perimeter ratio**
 - **“Representativeness”**

Sample Plots

How Established?

□ Circular

- Select plot size
- Determine radius

E.g. If we want a **0.01** ha plot, what **radius** to use?

1ha = 10000m² so **.01 ha = 100 m²**

$$\text{Area} = \pi * r^2$$

$$100\text{m}^2 = \pi * r^2$$

$$r = \text{sqrt} (100\text{m}^2/\pi)$$

$$r = 5.64\text{m}$$

Sample Plots

How Established?

□ Circular

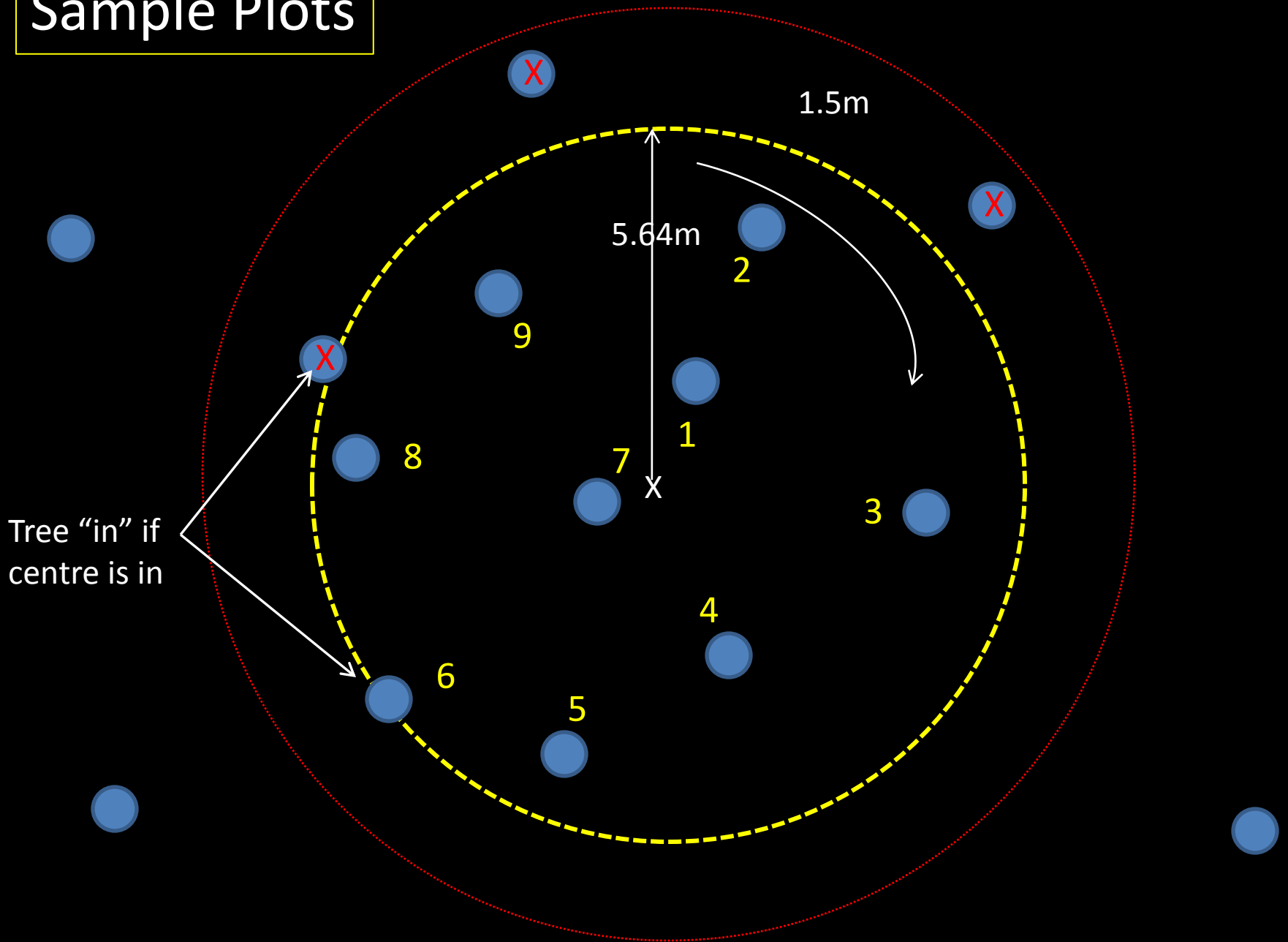
- **Locate and stake plot centre**
- **Run out correct radius with tape**
- **Starting with nearest tree**



- **Number trees with lumber crayon**
- **Number faces plot centre**
- **Proceed clockwise**
- **Mark with "X" trees outside plot, but within 1.5 m of boundary**

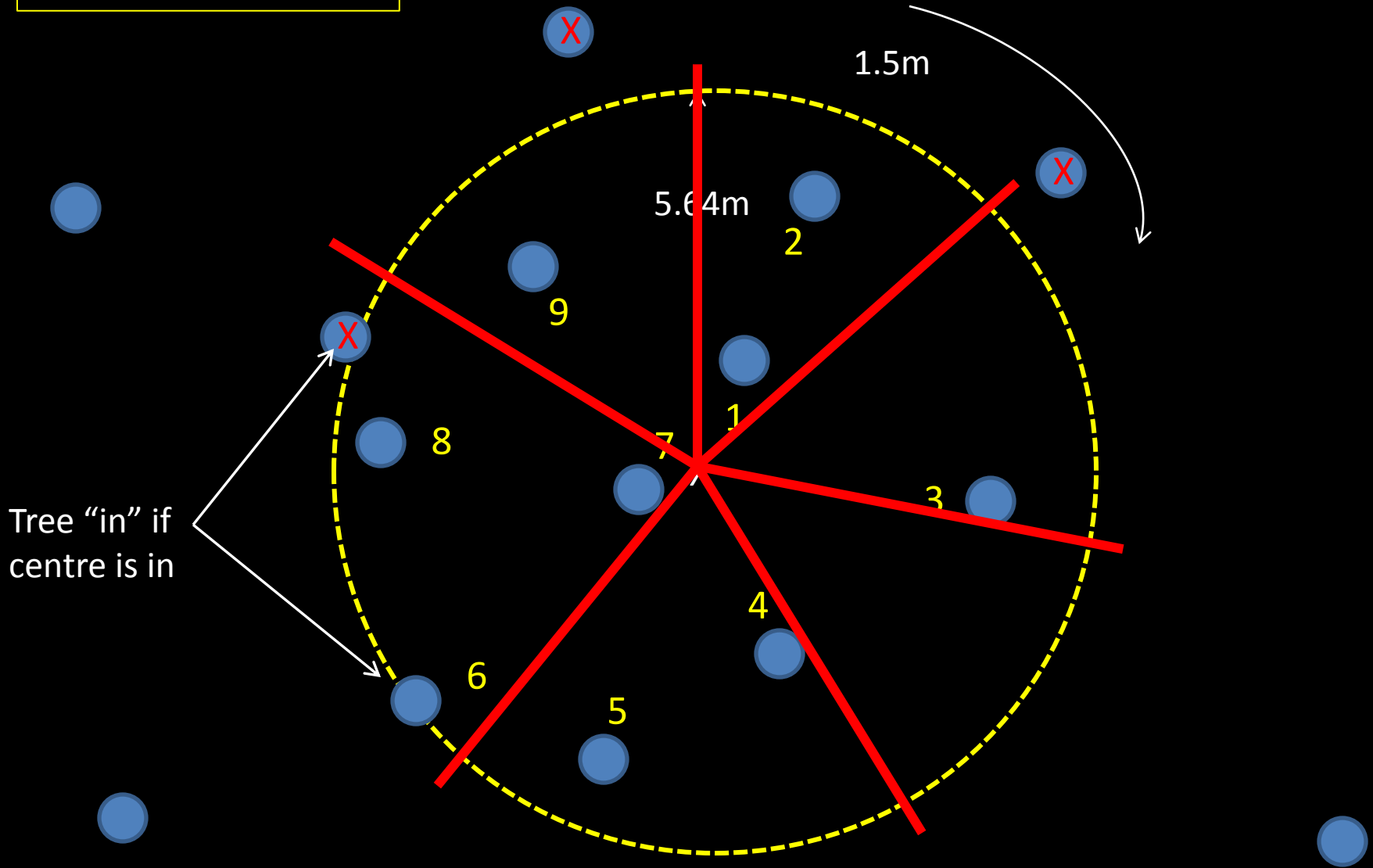
Sample Plots

100m² Circular Plot



Sample Plots

100m² Circular Plot



Summary

- we use *sample plots* to help us “*scale up*” information from *tree* to *stand* to *forest*
- plots must be *representative* of the area to which results are applied
- advantages and disadvantages to different plot *shapes* & *sizes* (*consider carefully* before choosing)
- regardless of shape and size, “*scaling up*” from plot to hectare to stand is the same for all *area plots*