DATA COLLECTION:

SWISS NEEDLE CAST

Ministry of Forests

OUTLINE

- Overview
- New Survey Procedure
- Data submission

SWISS NEEDLE CAST

- Produces fruiting bodies

- Can plug the stomata of Douglas fir

- 25-50% plugged= premature shedding

- Symptoms:
  - Low needle retention
  - Chlorotic foliage
  - Thinning crown
  - Reduced tree growth

Coming soon:
David Rusch will be posting a video on Swiss Needle Cast

WHY CARE?

<3.5 years of needle retention

=

Growth losses (DBH + height)

=

Longer rotations

Reduction in harvest level

Shift in species (e.g., Hw)
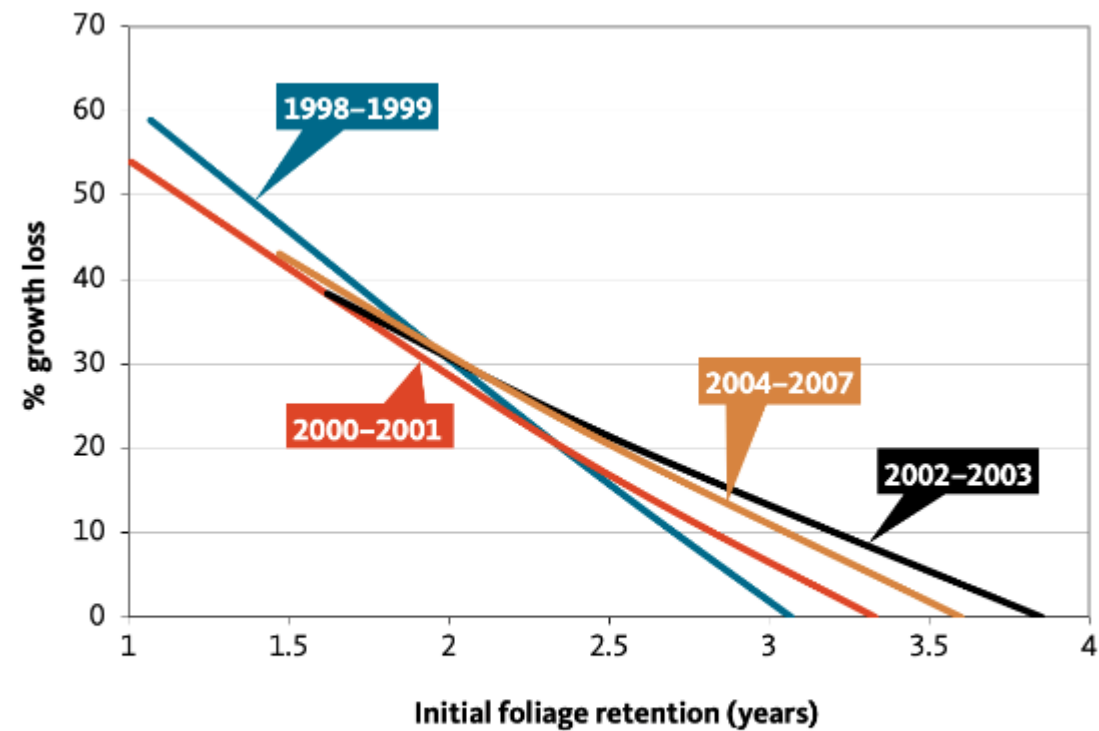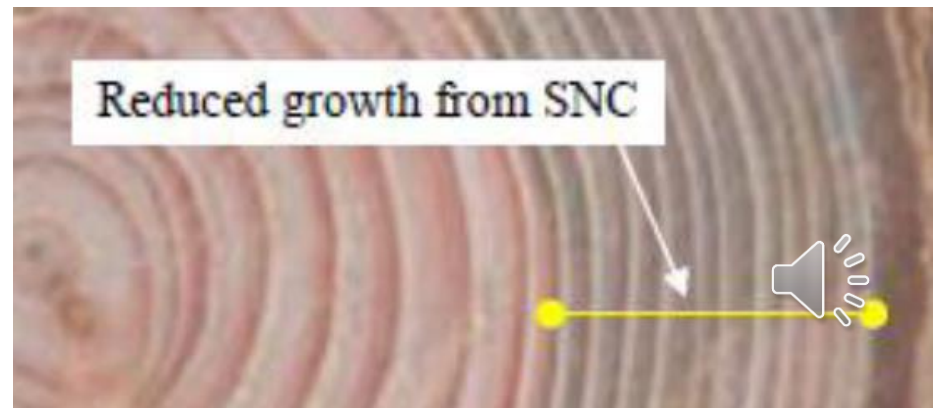
=

Economic losses

Figure 4. The percent growth losses associated with level of needle retention.
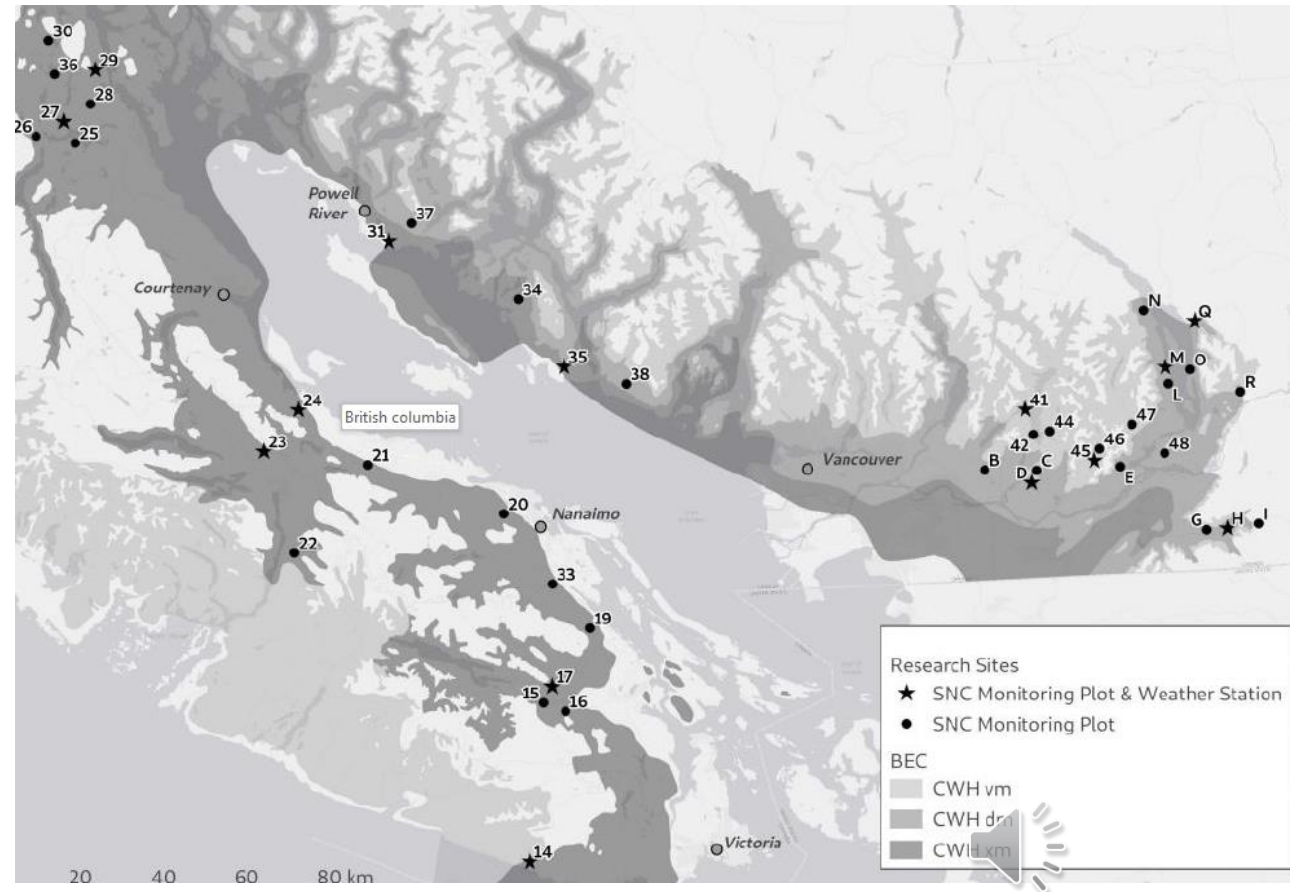
Credit: Doug Maguire, Center for Intensive Planted-Forest Silviculture, Oregon State University

Reduced growth from SNC

BRITISH COLUMBIA

- Increasing problem

- Highly variable

- Difficult to predict

- Losses have not been calculated

- Monitoring: transects, PSPs, aerial overview flights

- **Need monitoring over more area to understand impact and hazard**

WHAT STRATA?

- Stratum:
  - $\geq$ 50% Fdc (inventory label)
  - Trees $\geq$ 5 years old
  - All BEC subzones

- Objective: Collect SNC data on strata intended for Fdc management

- If non-Fdc natural infill levels are high, use a lower Fdc threshold (e.g., $\geq$30% Fdc).

WHICH PLOTS?

- 3.99m radius

- Full measure plots
  - E.g., 1, 5, 9, 13, etc.

- 3 samples minimum

Full measure plots capture the attributes of a count plot, **plus**:

- Inventory heights
- Inventory ages
- Crown closure

- Silviculture height(s)
- Silviculture age(s)
- Competing vegetation

Full measure plots happen at the first plot and every fourth plot thereafter. Ex. Plots 1, 5, 9, 13

Height and age measurements will sometimes happen at count plots when the target species is not present at the full measure plot.

Frequency of Measurements:

Measurements for silviculture and inventory heights/ages should be recorded on the first plot and every fourth plot thereafter. If the target species is not present, complete the height measurement at the next plot with the species present.

At minimum, three samples should be collected per stratum, although more samples are encouraged.

SAMPLE TREE

- Select tallest Fdc
- Exclude residuals
- Corresponds with inventory height/age sample tree

104. Inv SPP #1 Height (m): Select the tallest (excluding residuals) tree in the 3.99m radius plot for the leading inventory species of the stratum. Measure and record the height of the selected tree.

BASICS

- Record:
  - Plot #
  - Height
  - Age
  - Leader

- Consistent with survey manual

Determining Tree Age:

For species that exhibit determinate growth, age can be reliably estimated by counting the number of whorls.

For species that exhibit indeterminate growth or for younger trees, destructive sampling may be necessary to accurately determine age. Age can be determined by cutting a disc from the base of the sample tree and counting the number of rings.

The age of planted trees can be determined by adding the age of the planted stock plus the number of completed growing seasons since the planting treatment. When surveys are completed during the active growing season, record the number of completed year's growth.

For example:

If it's June 2022 and 1+0 trees were planted in September 2019, they would be 3 years old.

If it's June 2022 and 1+0 trees were planted in April 2019, they would be 4 years old.

If it's September 2022 and 1+0 trees were planted in September 2019, they would be 4 years old.

If it's September 2022 and 1+0 trees were planted in April 2019, they would be 5 years old.

If it's September 2022 and 2+0 seedlings were planted in April 2019, they would be 6 years old.

In older or multi-storied stands, tree ages are based on ring counts derived from bored core samples. Samples must include the correction factor for the bore height based on the site index. Refer to the FS660 for the correction factors.

Determining Tree Height:

Measure from the point of germination to the top of the dominant leader of the selected tree.

During the active growing season, include the leader growth (in-season partial growth) in the height measurement.
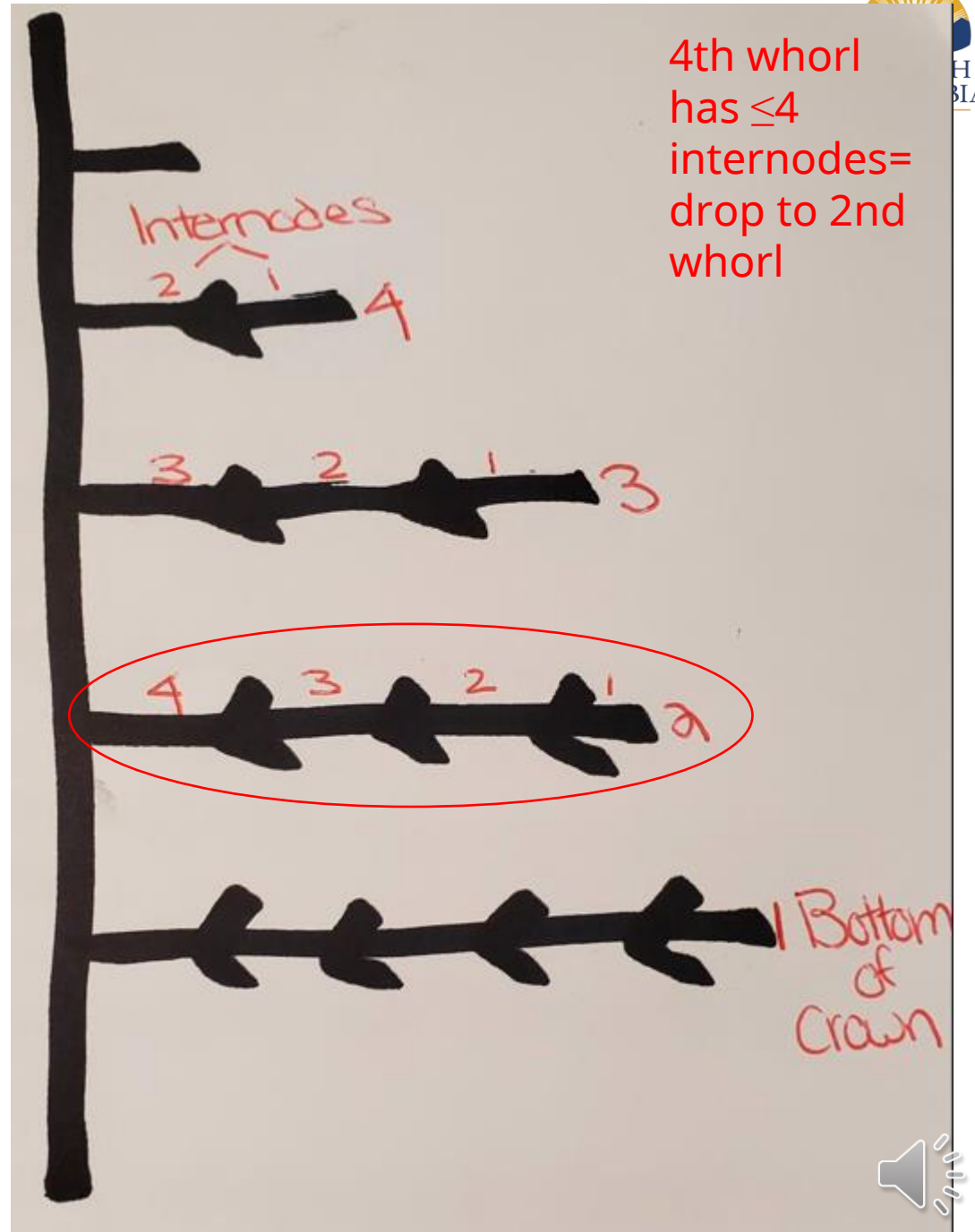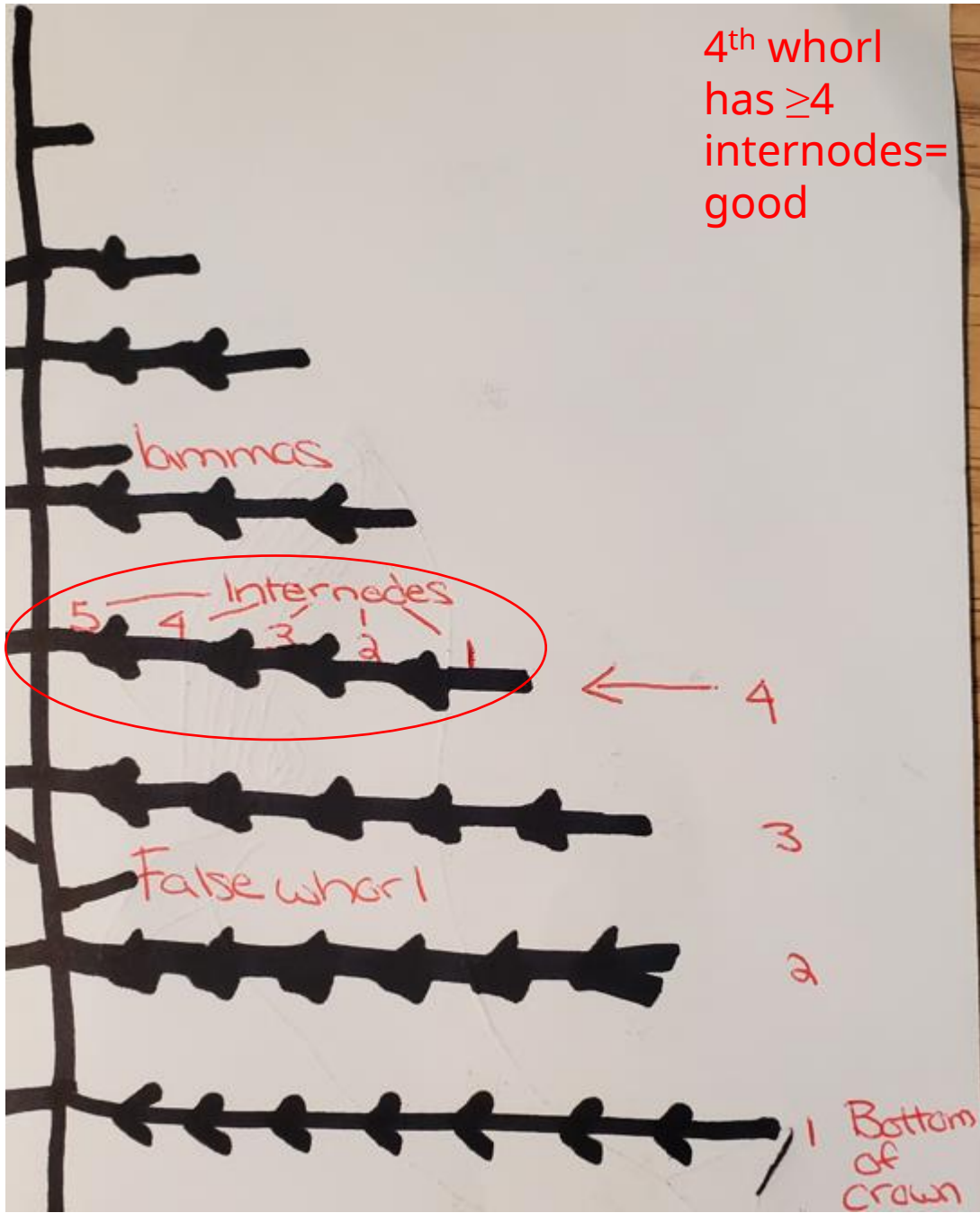
Height is expressed in metres to 1 decimal place. Ex. 4.1m
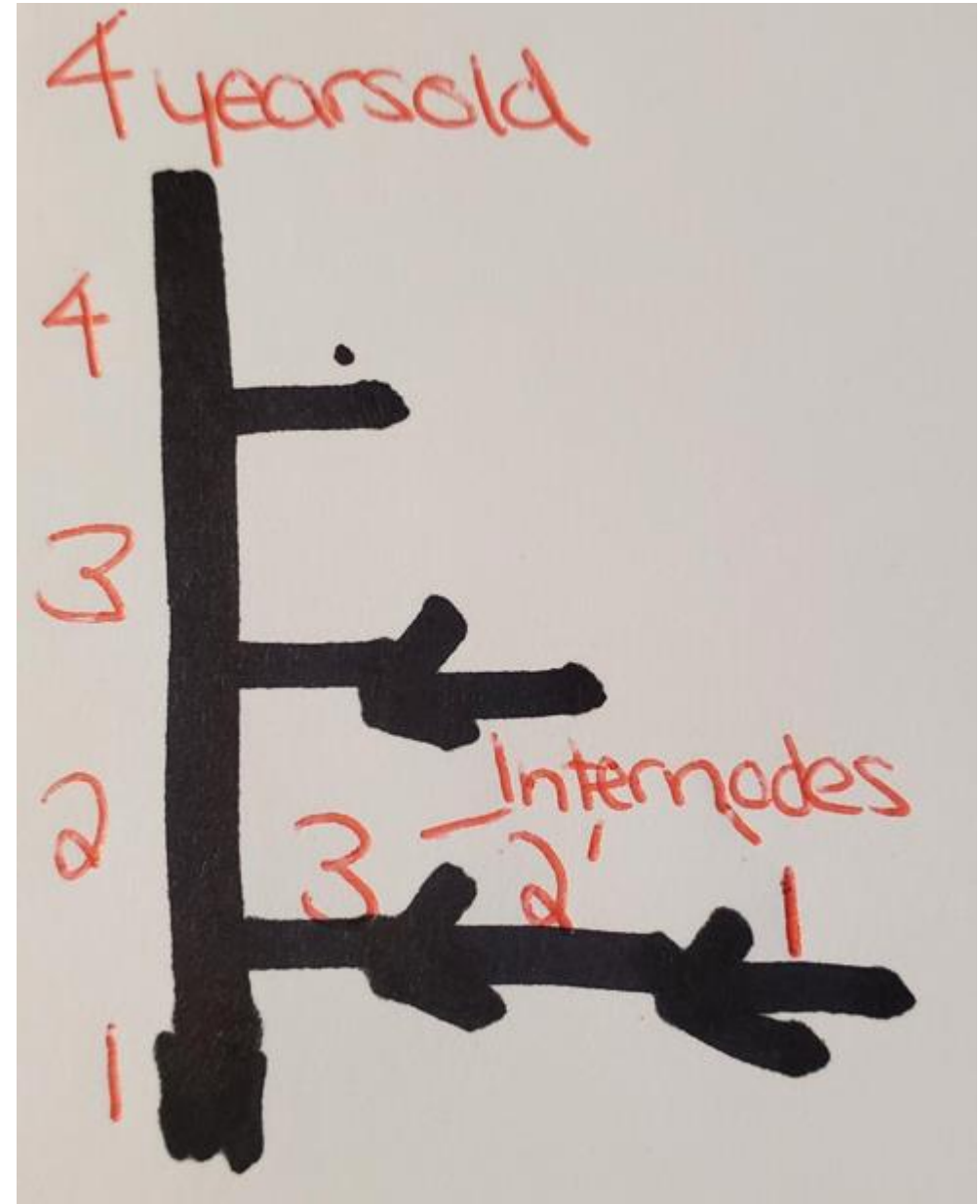
EXTRA

1. Go to the SOUTH side of the sample tree

2. Select a branch from the 4th whorl from the bottom of the living crown

3. Check if the main axis of the branch has 4 internodes.
   - If <4 internodes, drop down to the next whorl with 4 internodes.

Whorl

Internodes

Main Axis of Branch
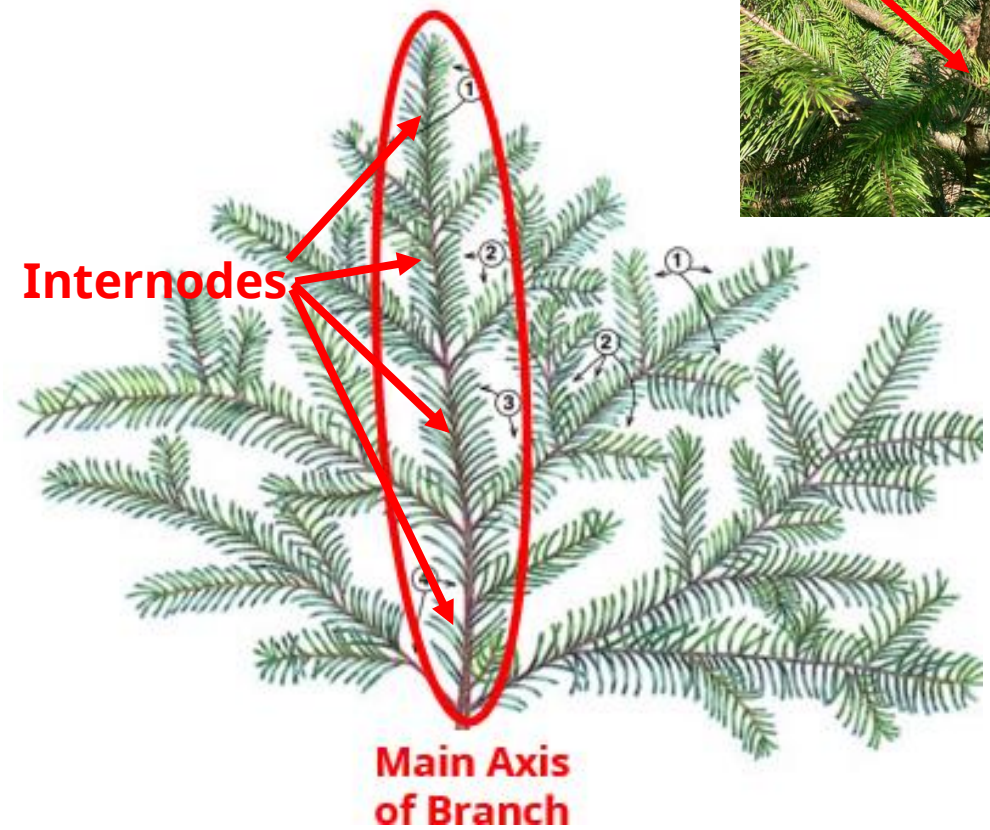
SUMMARY

- If ≤5 years old, the tree won't have 4 internodes. Do not collect data.

- If ≥8 years old, select a branch from the 4th whorl from the bottom.

- If 5-7 years old, pick the highest whorl with 4 internodes of growth.

EXTRA

4. Record the needle retention from 0-1 for the main stem of the 4 most recent internodes.
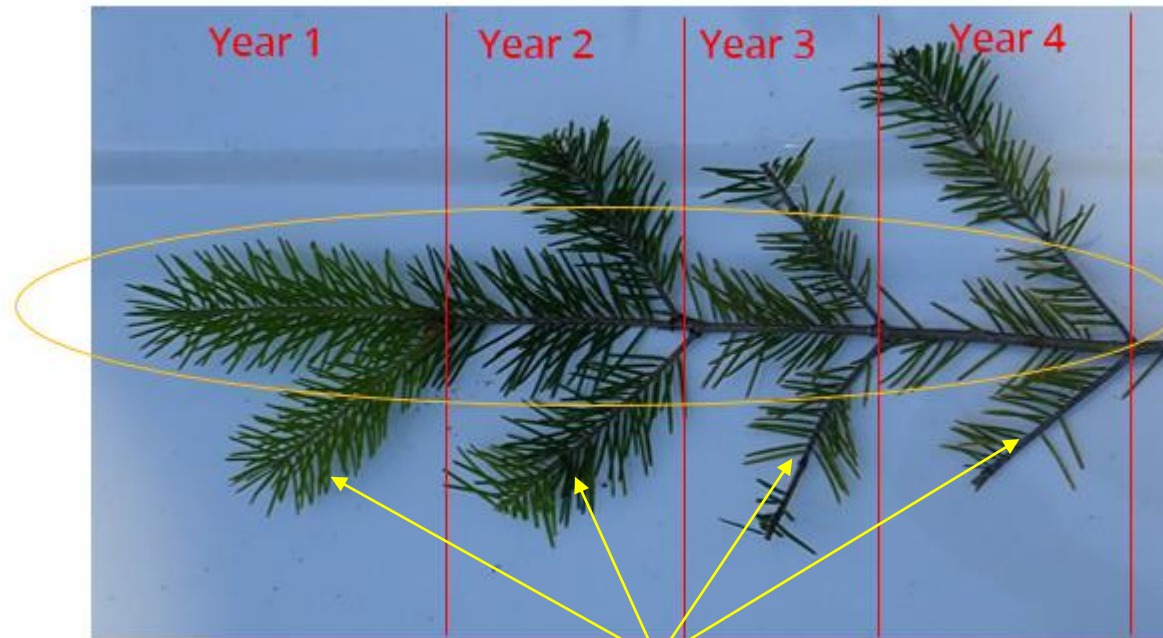
Only assess the main stem.

Ignore all side branches

Year	Needle Retention
1	1
2	0.8
3	0.5
4	0.2
Total	2.5

13

EXAMPLE 2

Ignore side branches

Only assess the main stem

Year 1

Year 2

Year 3

Year 4
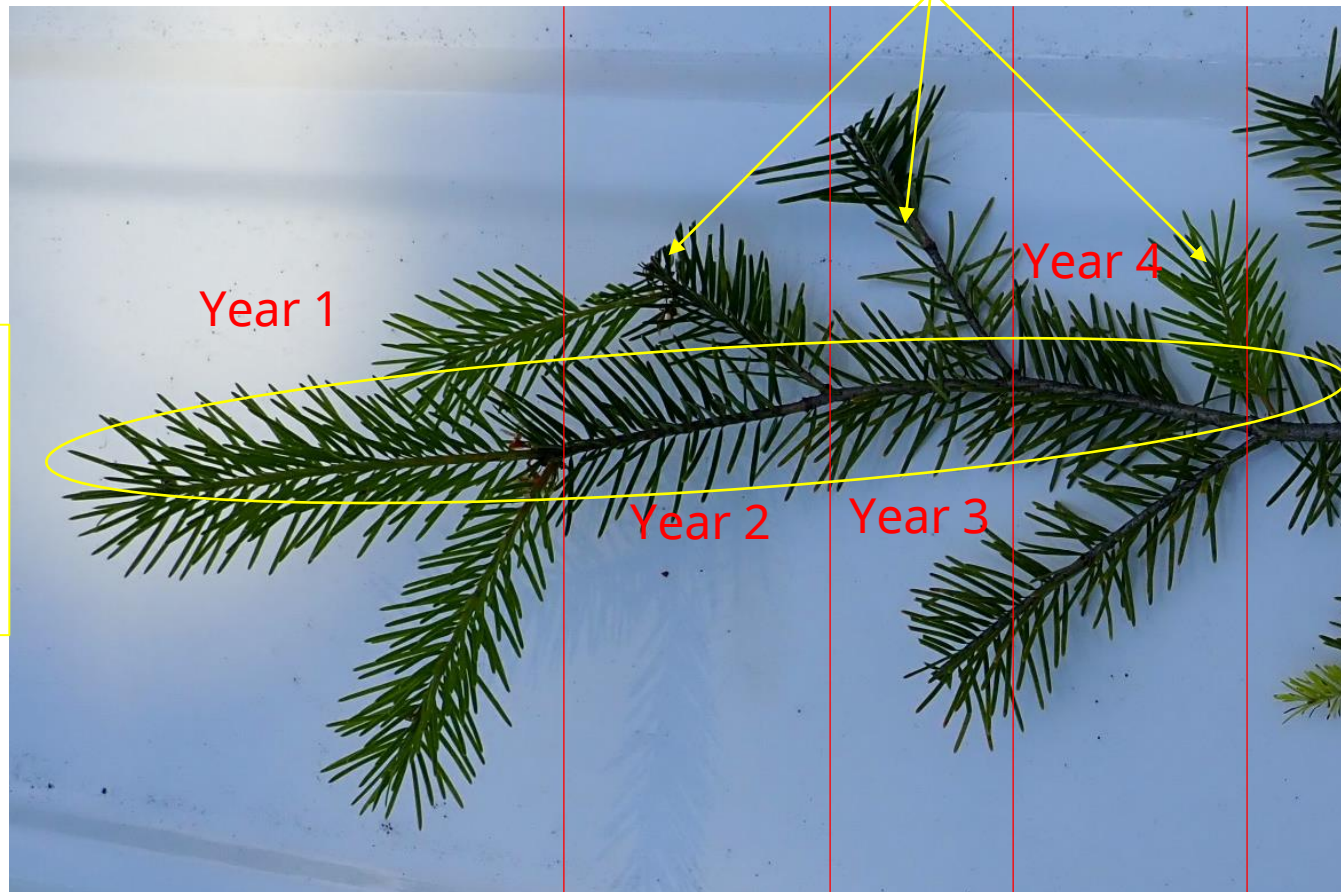
Year	Needle Retention
1	1
2	0.9
3	0.8
4	0.7
Total	**3.4**

EXAMPLE 3

Year	Needle Retention
1	1
2	1
3	0.4
4	0.2
Total	2.6

EXAMPLE 4
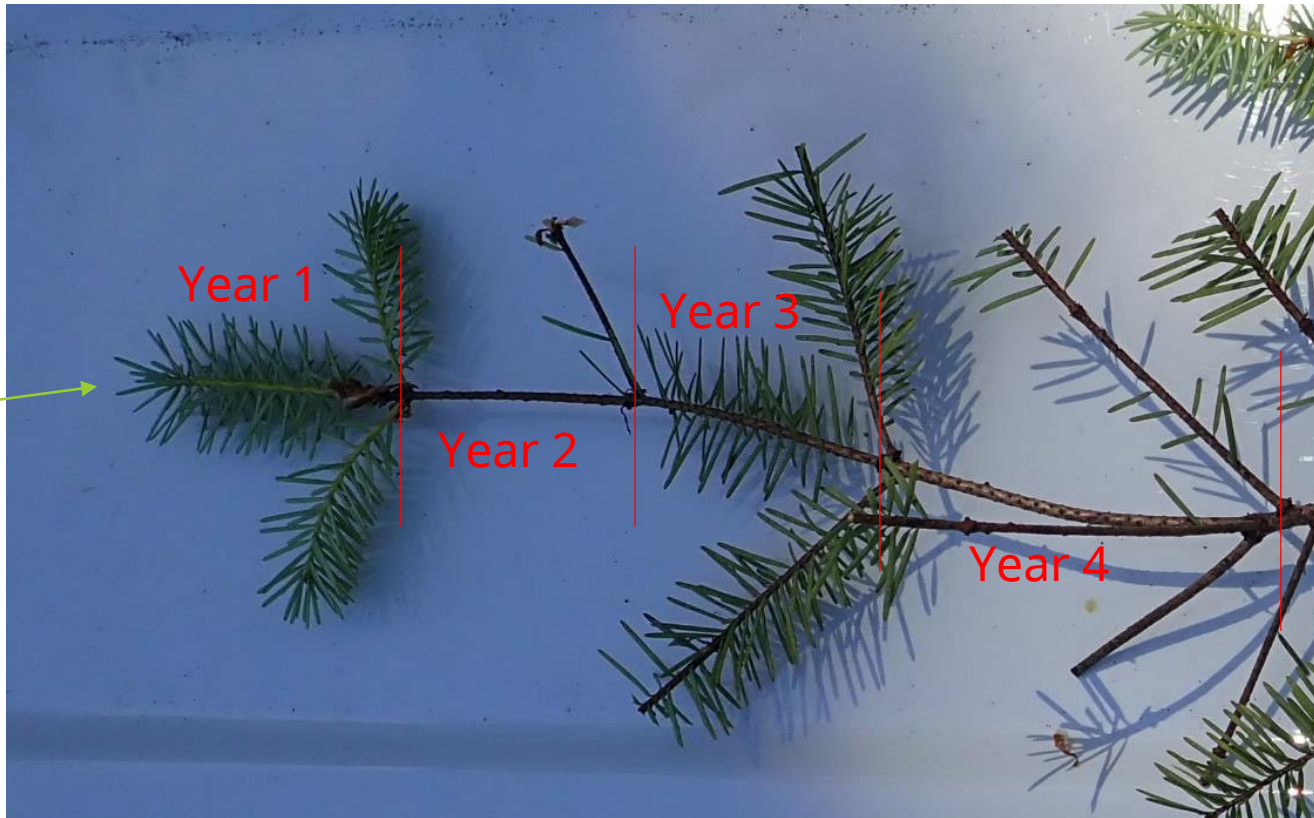
Only assess the main stem

Year	Needle Retention
1	1
2	0
3	0.8
4	0
Total	**1.8**

DATA ENTRY

- Can use:
  - Field notebook
  - Excel spreadsheet *(posted on website)*
  - SNAP
  - Other

- If you use SNAP, watch:
  - Swiss Needle Cast: Data Entry & Compilation Using SNAP

- Provides step by step instructions on:
  - SNAP data entry
  - SNAP Analysis tool
  - Excel processing

SWISS NEEDLE CAST:

DATA ENTRY & COMPILATION USING SNAP

SPREADSHEET

- Download submission template from BC Silviculture Surveys Reference Documents webpage.

- Includes:
  - Instructions
  - Examples
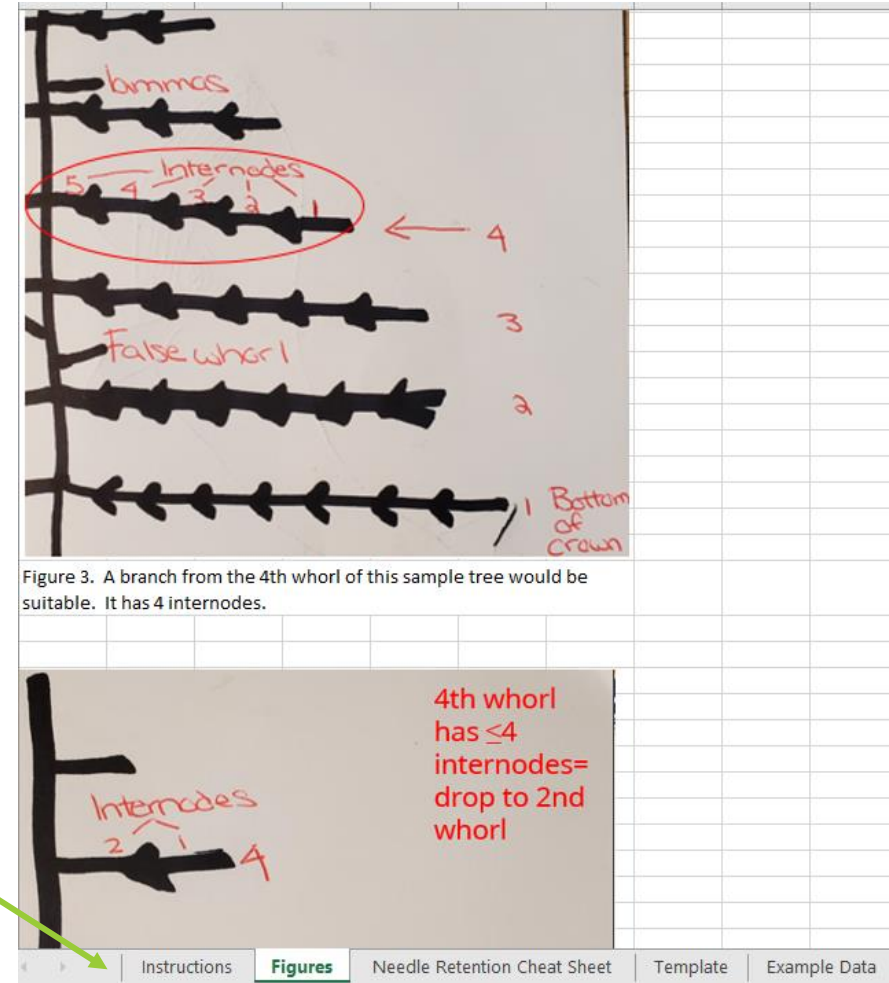 - Graphics
  - Sample data
  - Submission template

Figure 3. A branch from the 4th whorl of this sample tree would be suitable. It has 4 internodes.

4th whorl has ≤4 internodes= drop to 2nd whorl

Instructions | **Figures** | Needle Retention Cheat Sheet | Template | Example Data

SUBMISSION

- Share with taisa.brown@gov.bc.ca and david.rusch@gov.bc.ca

Opening #	Survey Date	SU	Subzone & Site Series	Plot #	Height	Age	Leader (cm)	Yr 1 (outer crown)	Yr 2	Yr 3	Yr 4	Total
5821564	2022-12-14	A	CWH xm2 01	1	4.9	10	60	1	1	1	1	4
5821564	2022-12-14	A	CWH xm2 01	5	5.2	10	60	1	1	1	1	4
5821564	2022-12-14	A	CWH xm2 01	9	4.6	10	50	0.8	0.9	0.2	1	2.9
452152	2022-06-11	A	CWH xm2 05	1	4.5	9	60	0.7	1	0.3	0.8	2.8
452152	2022-06-11	A	CWH xm2 05	5	4.8	9	70	1	0.8	0.2	0.7	2.7
80848	2022-02-21	A	CWH dm 01	1	3.2	9	25	0.5	0.6	0.2	0.8	2.1
80848	2022-02-21	A	CWH dm 01	5	3.4	9	20	0.8	1	0.8	1	3.6
345246	2022-04-25	A	CWH vm 1 01	1	3.3	9	40	0.5	0.9	0.9	0.8	3.1
345246	2022-04-25	A	CWH vm 1 01	5	3.6	9	28	0.4	0.8	0.3	0.8	2.3
345246	2022-04-25	A	CWH vm 1 01	9	3.5	9	10	0.6	1	0.4	0.9	2.9
64845	2022-09-12	B	CWH mm1 07	1	4.4	11	17	0.9	0.8	0.9	0.7	3.3
64845	2022-09-12	B	CWH mm1 07	5	4.2	11	15	0.4	1	0.5	0	1.9
64845	2022-09-12	B	CWH mm1 07	9	4.6	11	20	0.2	0.9	0.2	0.8	2.1
64845	2022-09-12	C	CWH mm1 05	12	4.5	11	60	0.8	0.7	0.1	0.9	2.5
64845	2022-09-12	C	CWH mm1 05	18	4.1	11	20	0.8	0.9	0	0.9	2.6
64845	2022-09-12	C	CWH mm1 05	22	4.8	11	60	0.7	1	0.8	1	3.5

CONCLUSION

- Need greater monitoring
  - Understand SNC hazard
  - Model SNC impact
  - Create adaptive strategies
  - Review stocking standards

QUESTIONS

- Taisa Brown
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- David Rusch
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Reach out if you want a forest health training session in your district!