

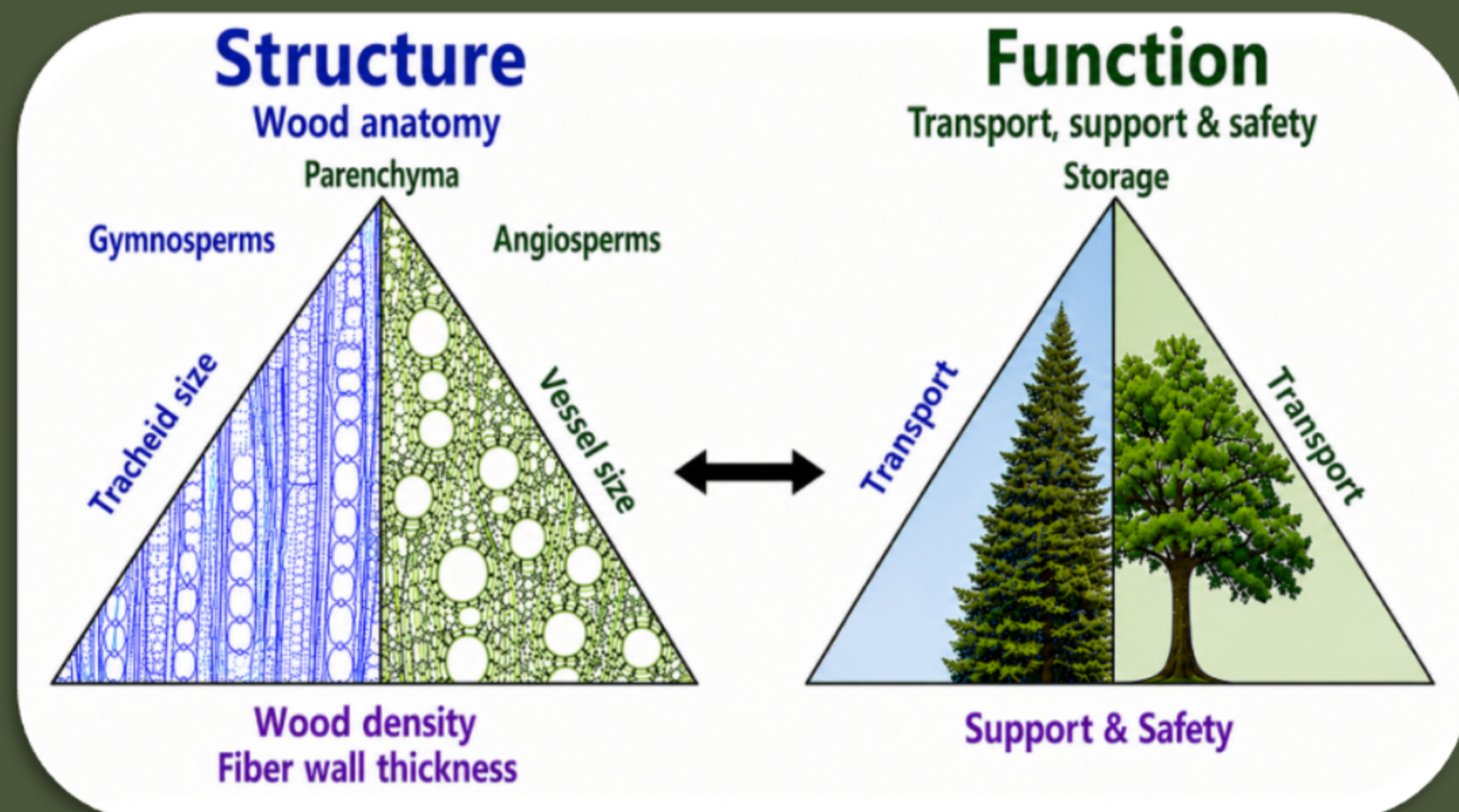
# Identifying the influence of diversity and historical and sudden shifts in water availability on tree growth and associated changes in hydraulic-anatomical traits

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## 1. CONTEXT



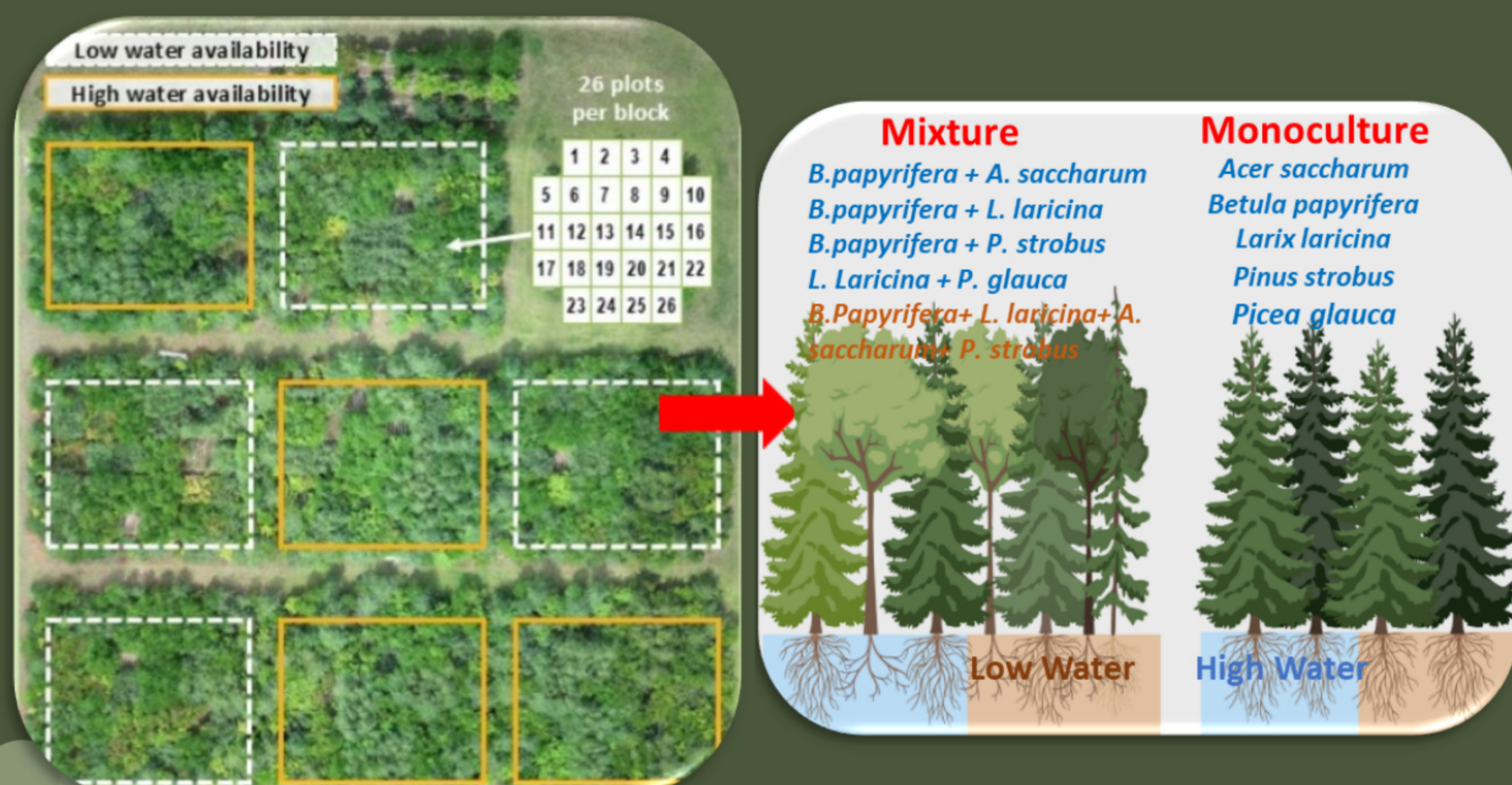
- Droughts impose intense water stress on trees, influencing their survival and growth
- Long-term tree survival and growth require trade-offs among hydraulic functions, e.g., safety, efficiency, and mechanical support
- Limited knowledge of trade-offs among hydraulic functions and their modulation by community diversity and water availability limits predictions of tree growth and survival under drought
- Community hydraulic trait diversity can enhance forest drought resilience by increasing the likelihood of the presence of drought-resistant species

## 2. RESEARCH QUESTIONS

1. How do **community diversity** and shift in **water availability** influence tree growth throughout the growing season before & after the shift in water availability
2. How do trees adjust **hydraulic and anatomical traits** under changing water availability, and how are these adjustments modulated by community diversity

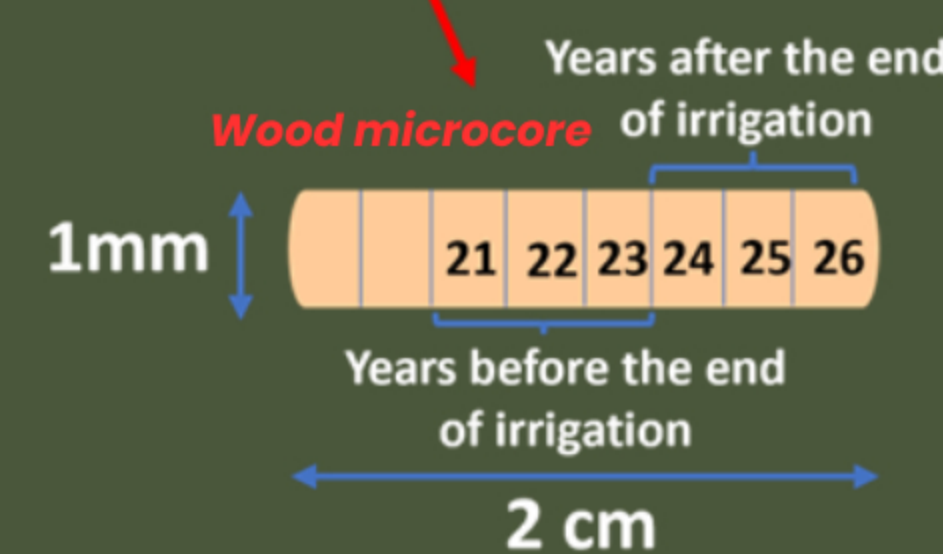
## 3. METHODOLOGY

### IDENT Sault Ste. Marie



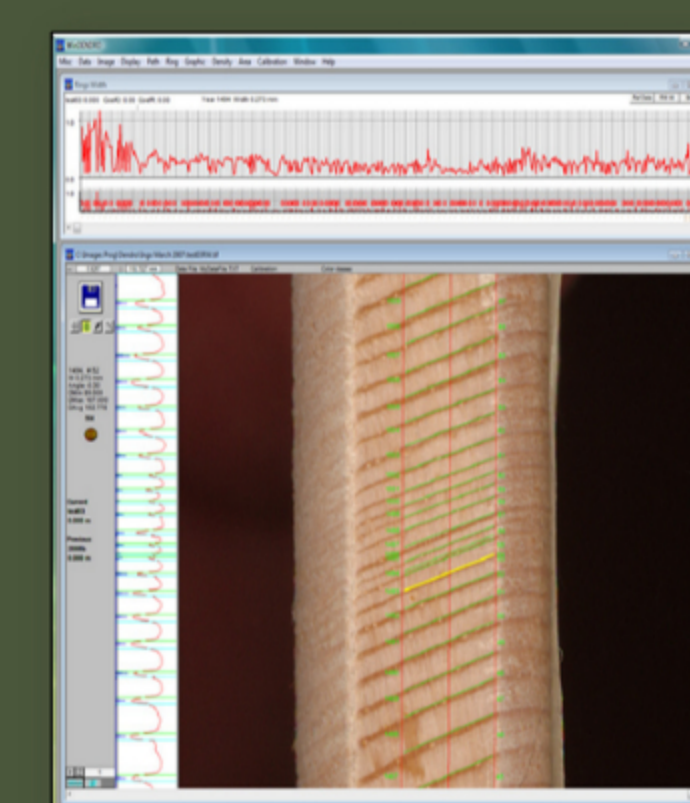
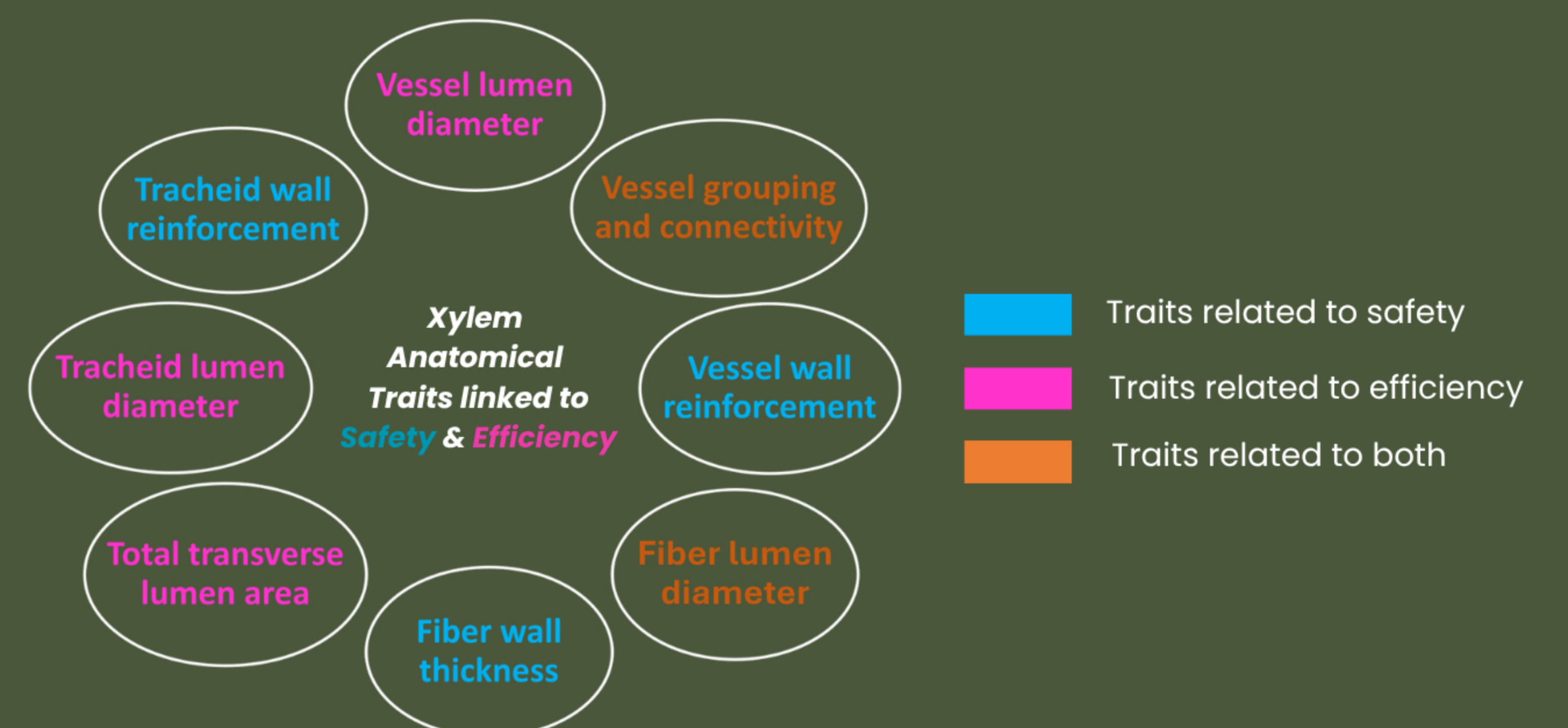
### IDENT Sault Ste. Marie

Irrigation Treatment	High water	Low water
	% of growing season precipitation	
Historical water availability (2014-2023)	230%	70%
Sudden shift in water availability (2024- present)	70%	70%

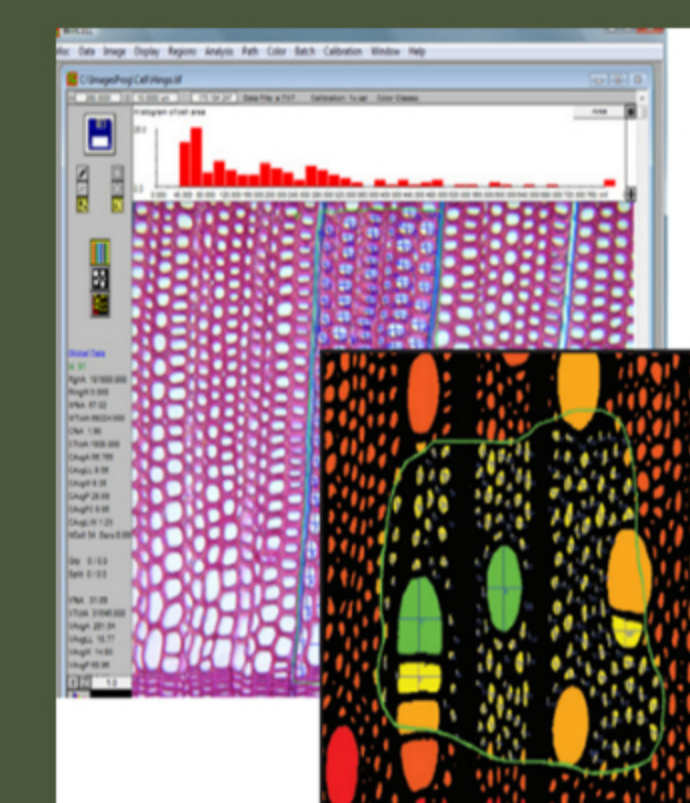


### Wood microcores

- One microcore from at least ten trees per species and treatment combination
- Total 340 microcores
- Measurements of ring width and xylem anatomical traits on the immediate three years before & after the end of irrigation



Roxas interface



Win CELL interface

Tree ring width and anatomical traits measurements

## 4. EXPECTED RESULTS

### Research question 1

Treatment	Response	Irrigation period	Expected relationship
Diversity	Tree growth	Before	High water < Low water
Diversity	Tree growth	After	High water > Low water
Water Availability	Tree growth	Before	High water > Low water
Water Availability	Tree growth	After	High water < Low water

### Research question 2

Trait type	Response to historical water availability	Response to sudden shift in water availability
Safety related traits	High water < Low water	Not expected to change strongly
Efficiency related traits	High water > Low water	Not expected to change strongly