

## Learning to go from observations to data to data presentations and back

- Much of learning in the basic and applied sciences involves making observations about some phenomenon, abstracting in one form or another those observations, and then conveying that abstraction to someone else.
- Conveying can be by picture, diagram, graph, written or spoken words, etc.
- Alternatively, you hear or see or read an abstraction and then you try to convert that abstract to something that fits your image or understanding of the system described.
- **This is a critical skill.**

## What is an abstraction?

- ...that which concentrates in itself the essential qualities of a larger thing or of several things.
- Implied is simplification, representation, conversion.
- Keys are:
  - Capturing important parts
  - Conveying that effectively
- We will focus on stand structure as an example.
  - Foundation for understanding such things as succession, habitat, etc.
  - Foundation for the management of those things.

# Forest Structure

Going from what you see to some abstraction of that is a critical step in basic and applied biology. The abstraction can be diagrammatic, photographic or graphical. Photographs can help, but are usually too complex or difficult to see adequate distances for interpretation or comparisons.

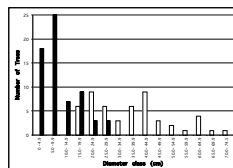
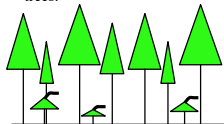
**How might you describe the two stands seen below? Next:**



## Forest Structure Represented by Four Different Abstractions



**Stand A** is composed of a 70-year-old overstory of Douglas-fir and an understory of a few western hemlock trees.



**Photograph**

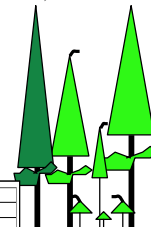
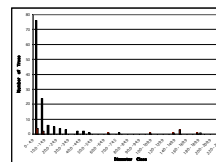


**Stand B** is composed of multi-layers: Overstory: large, old western redcedar & Douglas-fir; midstory: mostly western hemlock; & understory: Pacific silver fir, western hemlock & western redcedar

**Words**

**Pictorial Diagram**

**Graphically**

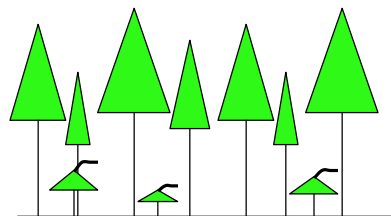


*Details follow*

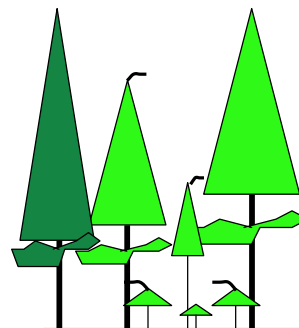
## Describing two stands - Verbally

- **Stand A** is composed of a 70-year-old overstory of Douglas-fir and an understory of a few western hemlock trees.
- **Stand B** is composed of multi-layers where large, old western redcedar and Douglas-fir make up the overstory, the midstory is composed of mostly western hemlock and the understory is a mixture of Pacific silver fir, western hemlock and western redcedar

## Describing Two stands Diagrammatically



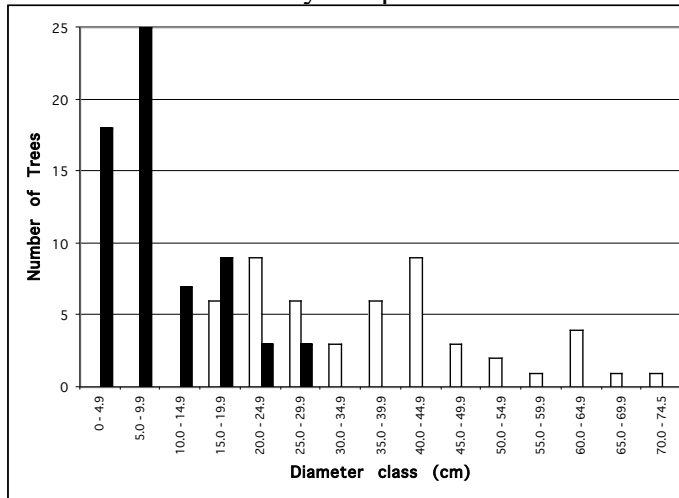
Stand A



Stand B

## Describing the Two Stands Graphically

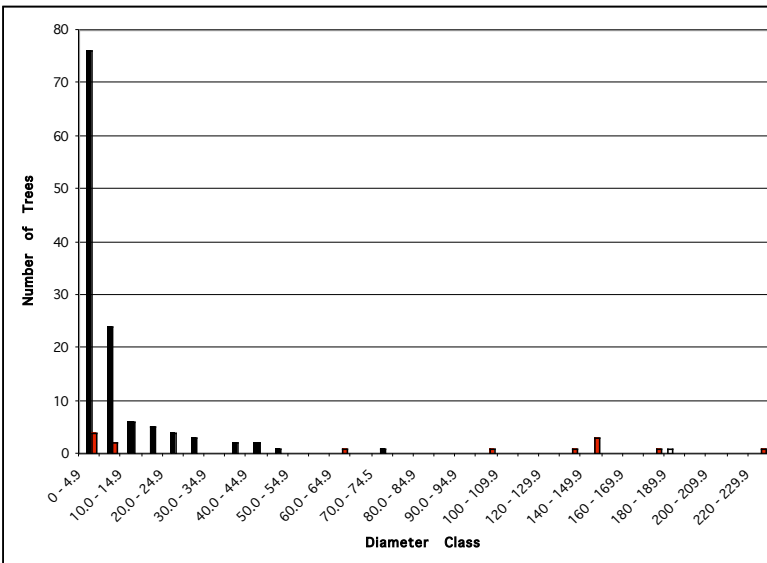
**Stand A:** Black bars are alive western hemlock and the open bars are alive Douglas-fir. Questions: Using size or number of trees describe the stand. Why this pattern?



This stand also contains 32 dead Douglas-fir and 17 dead hemlock. Dead DFs are between 7 and 28 cm, dead hemlocks are between 3 and 17 cm. Why?

## Describing the Two Stands Graphically

**Stand B:** Note one large Douglas-fir, 191 cm, several large western



redcedars, largest was 228 cm in diameter. Many small western hemlock, a few small western redcedar. Very few dead trees. Now go back to photos.

Link picture to description to diagram to graphical display



Stand A

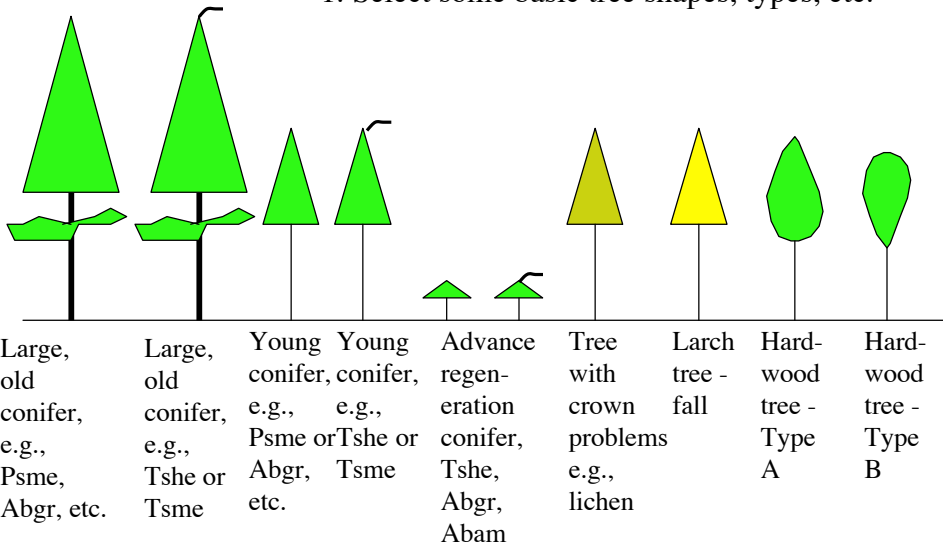


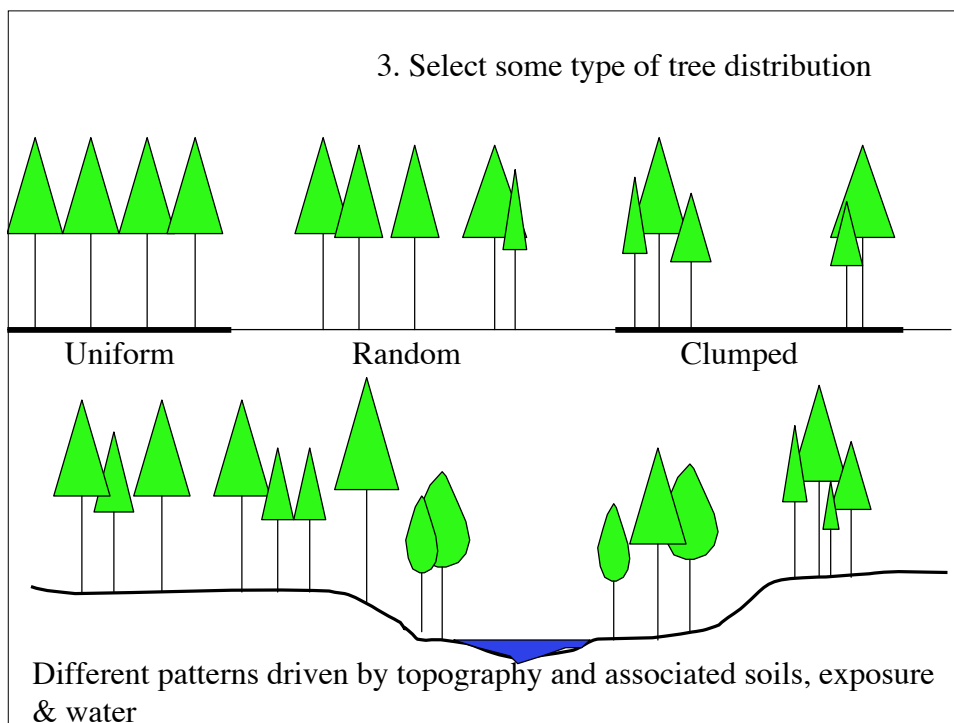
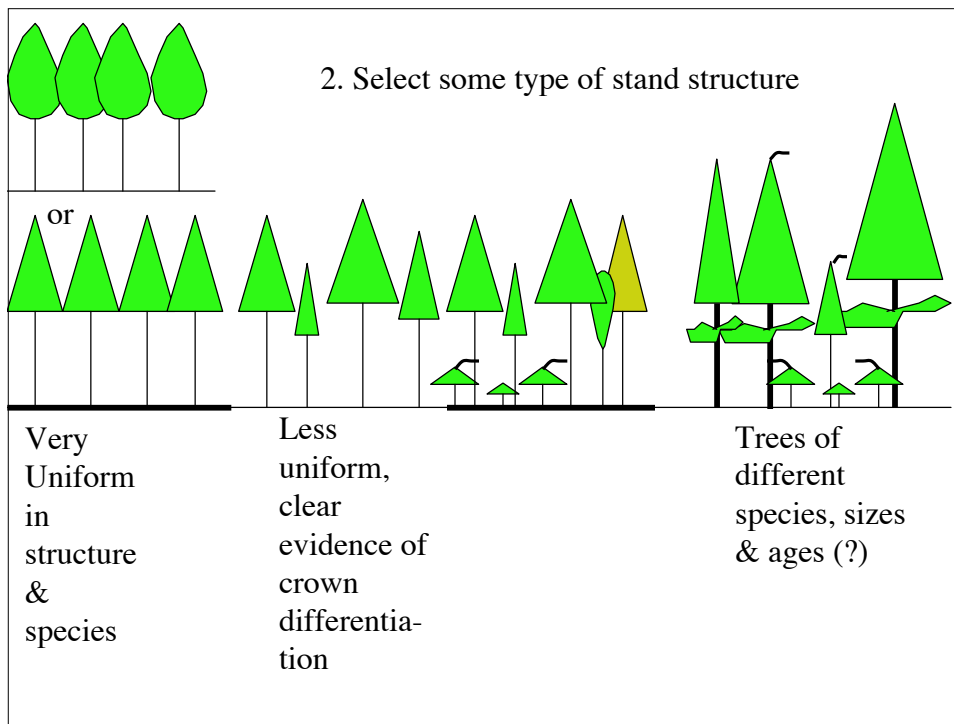
Stand B

For field trips, how will you describe stands in your journals? Details follow.

### Forest Structure - how to portray (diagrammatically, etc.)

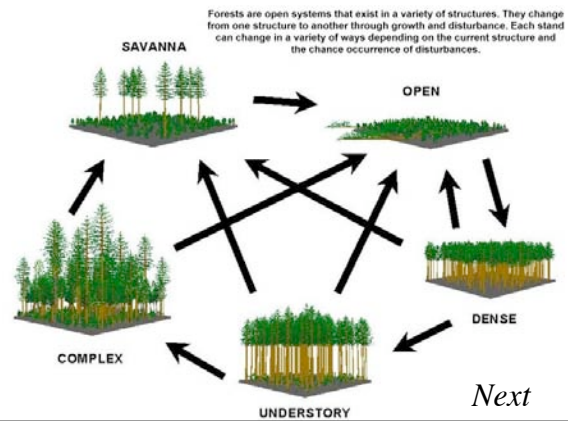
1. Select some basic tree shapes, types, etc.





Using diagrams and associated words, you should have an adequate description of the various stands that you will see during your field trips. So what do you do with this information? Understand stand composition, stand structure, stand history including pattern of succession, disturbance factors present (or even absent), and have a “road map” for comparison and management (see figure below for possible management scheme using LMS)

This diagram focuses on changes in stand structure with time and with management activity.



This diagram focuses on stand structure in space (each structure is the result of time and some management activity [please remember, doing nothing is still a management activity]).

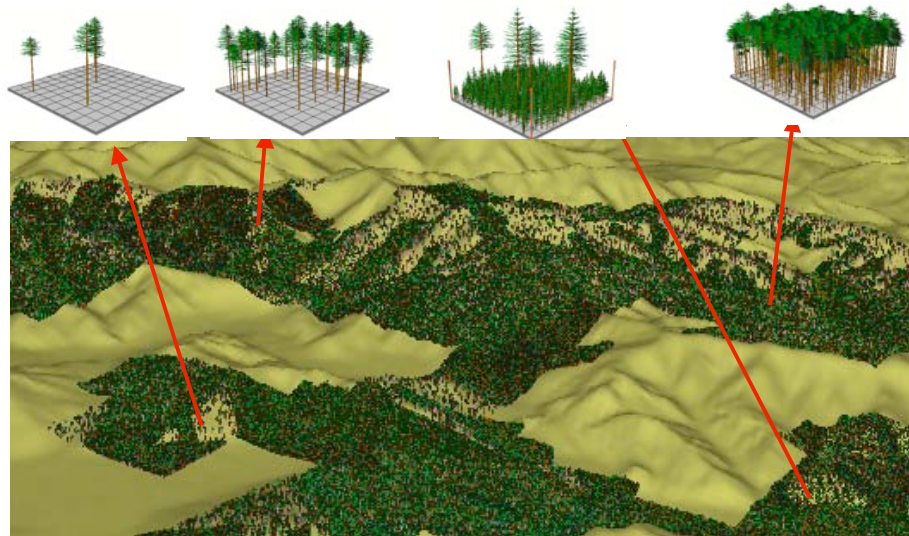


Diagram from Michael G. Andreu

## Summary

- You understand what an abstraction is and that it can take many different forms (e.g., written, photograph, etc.).
- You understand how to make abstractions of stands.
- You understand that abstractions all have weaknesses.
- Which is best? Depends upon the following: What kinds of decisions need to be made? By whom? What is the best form of the abstraction that will allow the decision makers to comprehend the situation and issues?