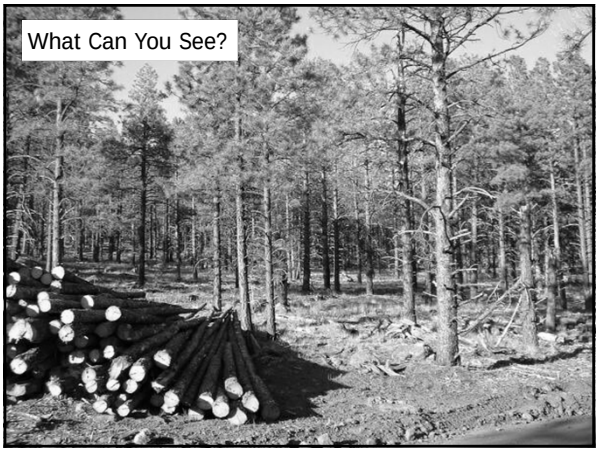
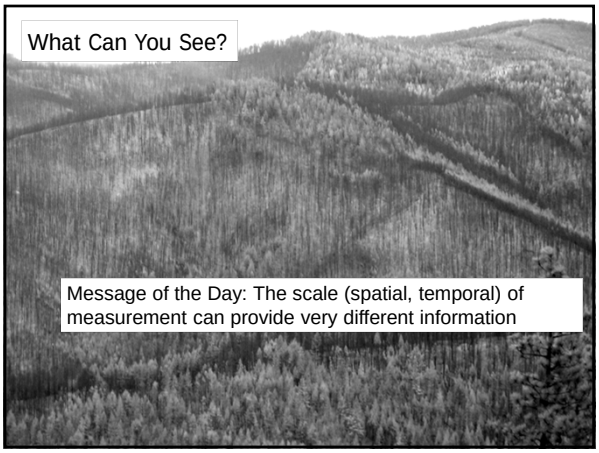

What Can You See?


What Can You See?


What Can You See?
Message of the Day: The scale (spatial, temporal) of measurement can provide very different information

FOR 274: Forest Measurements and Inventory

Lecture 1

- Class Overview
- Why Measurements
- Cruise Planning

Professor Smith
Phinney B12
alistair@uidaho.edu
Office Hours: Wed 1-3pm

Forest Inventory Experience:

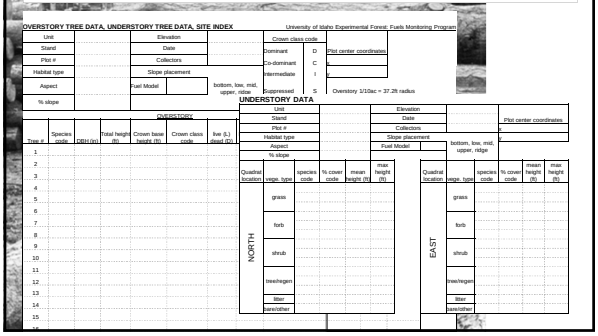
- Forest / fuels inventory and monitoring throughout the United States
- Lidar in support for forest inventory, fuels assessments, and snow
- Developing new timber volume relationships (allometrics)
- Developed and evaluated inventory designs for NPS and others

Measuring Fire Effects:

- Forests from western conifers to southeastern pines
- African savannahs and woodlands to United States rangelands
- Alaskan black spruce to the peat lands of Michigan

Course Goals: Field Sheets, Cruising, and Stand Exams

By the end of this course you should be able to Accurately create and complete any natural resource measurement field sheet.


OVERSTORY TREE DATA, UNDERSTORY TREE DATA, SITE INDEX

University of Idaho Experimental Forest: Fuels Monitoring Program

Unit | Elevation | Crown class code | Dominant D | Plot center coordinates
Stand | Date | Co-dominant C | E
Plot # | Collectors | Intermediate I | N
Habitat type | Slope placement | Suppressed S
Aspect | Fuel Model | bottom, low, mid, upper, ridge
% slope

Overstory 1/10ac = 37.2ft radius

OVERSTORY

Tree #	Species code	DBH (in)	Total height (ft)	Crown base height (ft)	Crown class code	live (L) dead (D)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

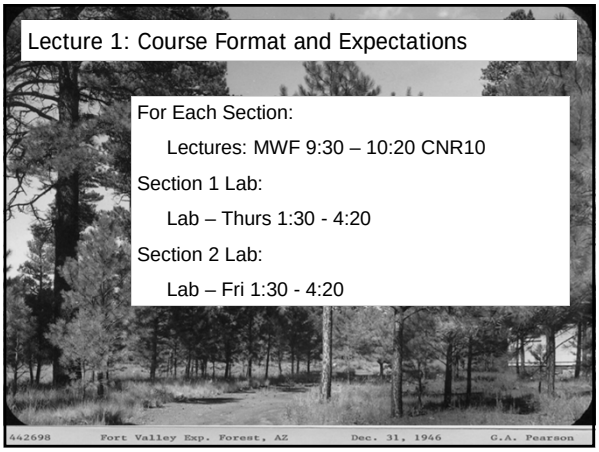
UNDERSTORY DATA

Unit | Elevation | Plot center coordinates
Stand | Date | E
Plot # | Collectors | N
Habitat type | Slope placement
Aspect | Fuel Model | bottom, low, mid, upper, ridge
% slope

Quadrat location	veget. type	species code	% cover code	mean height (ft)	max height (ft)
NORTH	grass				
	forb				
	shrub				
	tree/regen				
	litter				
	rock/other				

Quadrat location	veget. type	species code	% cover code	mean height (ft)	max height (ft)
EAST	grass				
	forb				
	shrub				
	tree/regen				
	litter				
	rock/other				

Lecture 1: Course Format and Expectations



For Each Section:

Lectures: MWF 9:30 – 10:20 CNR10

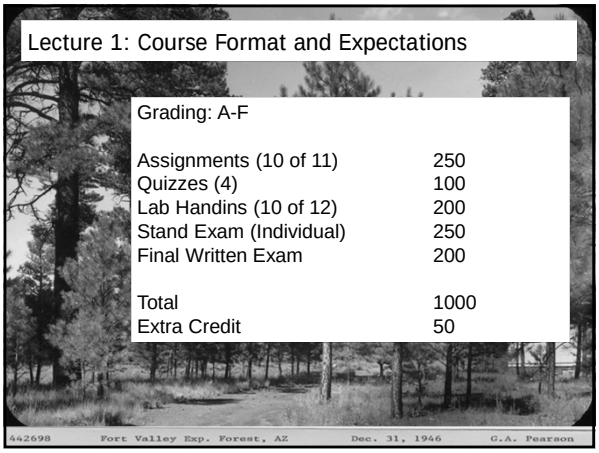
Section 1 Lab:

Lab – Thurs 1:30 - 4:20

Section 2 Lab:

Lab – Fri 1:30 - 4:20

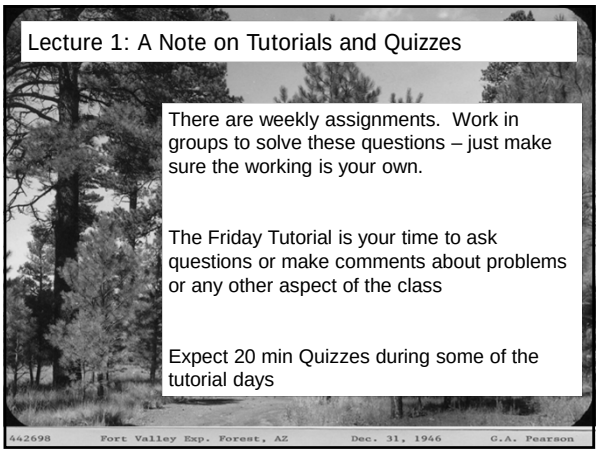
Lecture 1: Course Format and Expectations



Grading: A-F

Assignments (10 of 11)	250
Quizzes (4)	100
Lab Handins (10 of 12)	200
Stand Exam (Individual)	250
Final Written Exam	200
Total	1000
Extra Credit	50

Lecture 1: A Note on Tutorials and Quizzes



There are weekly assignments. Work in groups to solve these questions – just make sure the working is your own.

The Friday Tutorial is your time to ask questions or make comments about problems or any other aspect of the class

Expect 20 min Quizzes during some of the tutorial days

Lecture 1: A Note on Lectures & Textbooks

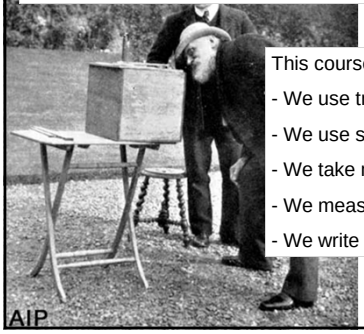
University Courses Teach Theory and Fundamentals:

- Learn more than specific examples
- Solve ANY problem
- Able to critically think and ASK Questions about a situation

Course Website: http://www.cnr.uidaho.edu/for274new/

Lecture 1: A Quick Note

In all fields of science the ability to take repeatable and accurate measurements of a quantity is essential.

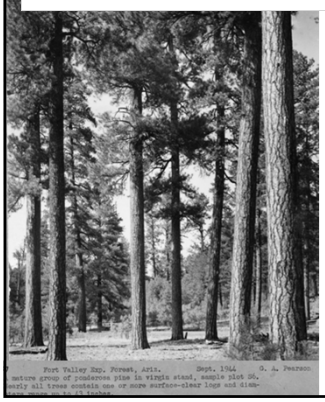


This course is quantitative:

- We use trigonometry
- We use statistics
- We take measurements
- We measure errors
- We write reports

AIP

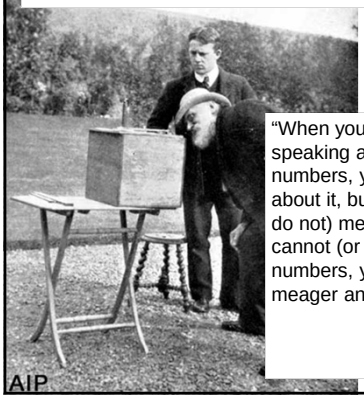
FOR 274: Forest Measurements and Inventory



Lecture 1

- Class Overview
- Why Measurements
- Cruise Planning
- Numbers and Errors
- Communication

Lecture 1: Introduction to Forest Measurements

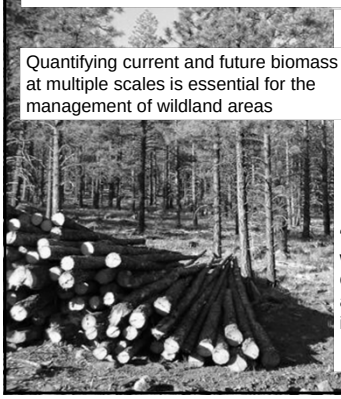


"When you measure what you are speaking about and express it in numbers, you know something about it, but when you cannot (or do not) measure it, when you cannot (or do not) express it in numbers, you knowledge is of a meager and unsatisfactory kind."

Lord Kelvin

AIP

Lecture 1: Introduction to Forest Measurements



Quantifying current and future biomass at multiple scales is essential for the management of wildland areas

"Forest measurements deals with the study of the volume of logs, trees, and stands, and with the study of increment and yield."

Henry S Graves (1906)

Lecture 1: Introduction to Forest Measurements

Where does Forest Measurements fit in forest science?

- Tree Physiology: The study of how trees grow based on biology, physics, and chemistry. This field of science is helping us understand how climate and other factors (such as disturbances) are affecting the future production of biomass

- Forest Growth and Silviculture: Experiments and models to predict growth and succession based on biology, ecology, climate, and soil science. This field of science is essential to forest management as it helps us understand the impacts of site, treatments, genetics, etc

- Forest Inventory: Management and Research to quantify how much resources is currently present in a forest. These resources could be timber volume, water and water quality, carbon sequestration, wildlife habitats, etc. This area of research often includes the analysis of aerial photography and more recently laser altimetry data.

Lecture 1: Introduction to Forest Measurements

Region 6 of the USFS outlines 4 levels of certification for timber cruisers. This and other classes will provide you with these skills.

Qualified Cruiser: The qualified cruiser is responsible for applying a variety of volume determination techniques. As a minimum, the cruiser must be proficient in cruising fundamentals such a tree measurement, species identification, defect recognition and determination, quality determination, map reading and compass use traversing, photo interpretation, working knowledge of the commonly used cruise systems and be able to interpret and follow a timber cruise plan.

Advanced Cruiser: The advanced cruiser is fully qualified to design, perform measurements, train prospective production cruisers, conduct all types of timber cruises, and design and implement cruises. Experience, technical interest, training ability, and initiative characterize this classification.

Check Cruiser: The check cruiser is responsible for check cruising, cruiser training and conducting evaluations to recommend certification of qualified and advanced cruisers. The check cruiser maintains an active field check cruising program, retain records of individual cruisers, retains records of sale check cruise results. The check cruiser inspect timber cruises and recommend acceptance or identify deficiencies and corrective actions for them. Additionally, they are responsible for establishing Forest certification test areas.

Master Cruiser: The master cruiser is certified by the Regional Forester and serves as a representative for cruising and coordinates the Regional quality control program.

Lecture 1: Introduction to Forest Measurements

Managers are faced with many decisions:

What treatments to use, When to thin and when to burn, What is the value of a potential sale, what are the potentials for recreation, wildlife, carbon storage, etc

Information is needed to answer such questions:

This information should be quantitative and have the same meaning in other environments and to other people

Forest measurements provide managers with quantitative data to enable reliable (and defensible) decision making

Husch, Beers, and Kershaw

442698 Fort Valley Exp. Forest, AZ Dec. 31, 1946 G.A. Pearson

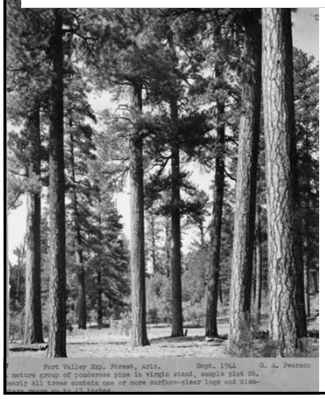
Forest Measurements is Continually Changing

Main Historical Milestones:

- Hennet (1791) developed tree volume relations based on the amount of water displaced by timber
- Paulsen (1795) developed the first growth and yield tables
- Cotta (1804) invented the caliper and constructed the first volume tables
- Bitterlich (1948) developed the angle count concept to estimate basal area per hectare
- Bickford (1963) developed a sampling schema that used aerial photography with stand data
- Nelson (1984) was one of the first researchers to use Lidar to evaluate forest canopy and biomass
- Falkowski (2009) developed methods to map forest successional stage with Lidar

Left: Brian Geils (1962)

FOR 274: Forest Measurements and Inventory



Lecture 1

- Class Overview
- Why Measurements
- Cruise Planning

Forest Measurements: Cruise Planning

Cruise plans are developed when an inventory is needed. The cruise plan contains the instructions for the crew and will contain the standard operating procedures (SOPs) relevant to the sale.

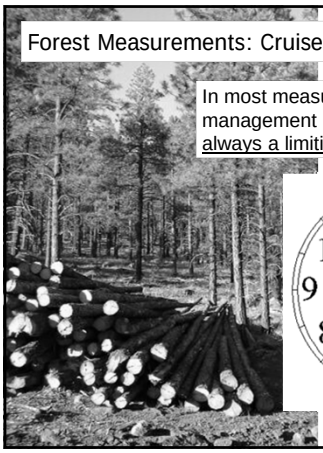
A cruise plan at a minimum will contain:

- Sampling Methods
- Sampling Intensity
- Product merchantability information
- Sale area maps

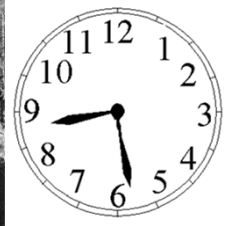
Other common elements:

- Past silvaculture prescriptions
- What type of plots will be used
- Sale / cruise information
- Identify standing defect methods
- How to handle boundary plots
- Methods and accuracies of approaches
- Describe how trees/plots will be marked

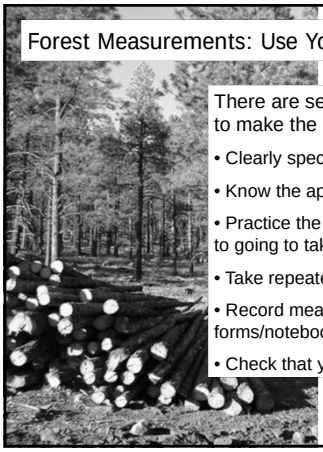
Forest Measurements: Cruise Planning



In most measurement activities, whether management or research, TIME is nearly always a limiting factor.



Forest Measurements: Use Your Time Wisely



There are several steps you can follow to make the best use of your time:

- Clearly specify each objective
- Know the appropriate tools for each task
- Practice the correct use of each tool prior to going to take measurements for real
- Take repeated measurements
- Record measurements in field forms/notebook
- Check that your answer is sensible