

Alabama Forestry Invitational

State Manual & Study Guide



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Alabama Cooperative Extension System

Mission Statement

The Alabama Cooperative Extension System, the primary outreach organization for the land grant mission of Alabama A&M University and Auburn University, delivers research-based educational programs that enable people to improve their quality of life and economic well-being.

ALABAMA 4-H VISION Alabama 4-H is an innovative, responsive leader in developing youth to be productive citizens and leaders in a complex and dynamic society. Our vision is supported through the collaborative, committed efforts of Extension professionals, youth, and volunteers.

ALABAMA 4-H MISSION 4-H is the youth development component of the Alabama Cooperative Extension System. 4-H helps young people from rural and urban areas explore their interests and expand their awareness of our world while providing opportunities to develop a greater sense of who they are and who they can become—as contributing citizens of our communities, our state, our nation, and our world. This mission is achieved through research-based educational programs of Alabama A&M and Auburn Universities and an ongoing tradition of applied, hands-on/minds-on experiences, which develop the heads, hearts, hands, and health of Alabama youth. 4-H is a community of young people across Alabama who are learning leadership, citizenship, and life skills.



Disclaimer: Contents of this guide are intended for internal audiences and are subject to change.

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Welcome

The Alabama Cooperative Extension System 4-H Program invites you to join the team by becoming a Forestry Invitational participant.

By working as a team, we can provide more opportunities for youth and adults to learn about forestry and natural resource management. Together we can increase awareness of Alabama's resources and ensure quality forest habitat for future generations.

The purpose of this guide is to provide you with information and tools necessary for developing practical forestry skills and preparing youth ages 9 to 18 to become successful Forestry Invitational participants.

The provided activities and teaching methods can be tailored according to age, number of students in the class, and the physical learning environment. Pertinent information and resources to make teaching your participants as easy as possible are included, as well as tips for working with a team.

4-H Forestry offers Junior and Senior level opportunities. Participants will learn how to manage and conserve a variety of forest habitats by acquiring skills in tree species identification, timber measurement, insect and disease identification, compass and pacing, and evaluating forest growth.

Introduction

Objectives

- Develop awareness and appreciation of the need and importance of conserving natural resources
- Acquire information and understanding of practical forestry skills
- Develop citizenship and leadership knowledge and skills
- Demonstrate knowledge and skills by participating in state-level forestry judging activities
- Receive recognition for accomplishments

Knowledge and Skills

- Forest habitat management and conservation
- Identification of tree species
- Tree measurement
- Identification of forest insects and diseases
- Compass and pacing
- Forest stand evaluation
- Critical thinking, decision making, communication, and team building skills

Code of Conduct

All participants are required to follow the 4-H Code of Conduct.

Contest

Seniors will compete in all seven contest rotations, and the winning team will have the opportunity to represent Alabama at the National 4-H Forestry Invitational held annually at the Jackson's Mill 4-H Center in Weston, West Virginia. **Juniors** will compete in all contest rotations with the exception of Insects and Diseases, though they will participate for practice. You are encouraged to enlist the help of local foresters and other subject matter experts to assist with training teams.

Additional Resources

Instructional Videos:

Compass and Pacing

<http://www.youtube.com/watch?v=C-oJVulp1ek&list=PLB662BB96927FA87A>

Insect and Disease Pests

<http://www.forestry.state.al.us/ResourceSheets.aspx?bv=5&s=0>

Publications:

A Key to Common Trees of Alabama

<http://www.aces.edu/pubs/docs/A/ANR-0509/ANR-0509.pdf>

Forest Ecology

<http://www.aces.edu/pubs/docs/Y/YANR-0196/YANR-0196.pdf>

National 4-H Forestry Invitational:

Forestry Manuals and Contest Lists

<http://4hforestryinvitational.org/training/forestry-manuals>

Alabama Forestry Invitational Competition

The Alabama Forestry Invitational is a competitive event designed to help 4-H'ers develop their natural resources knowledge and skills. Participating teams from any county or region will compete in team events to put their forestry knowledge to the ultimate test.

Participants will accomplish the following:

- Develop leadership talents and work toward achieving character development and effective citizenship
- Develop appreciation of the need and importance of conserving natural resources as sources of products and services necessary for quality living
- Acquire information and understanding of practical forestry skills
- Work towards representing Alabama at the National 4-H Forestry Invitational

Contest Rotations

1. Tree Identification
2. Tree Measurement
3. Compass Traverse
4. Topographic Map Interpretation
5. Insect and Disease Identification
6. Forest Evaluation (Seniors only)
7. Forestry Quiz (Seniors only)
8. Knowledge Bowl

Example Event Schedule

Day One

10:30 to 11:45 a.m.	Registration/Check-in
12:00 to 12:30 p.m.	Senior Forestry Quiz
1:00 to 1:15 p.m.	Orientation
1:30 to 5:30 p.m.	Field Competition (Rotating Groups as Assigned)

<u>Tree ID</u>	<u>Tree Mea</u>	<u>I&D/Maps</u>	<u>Compass</u>
Maple	Magnolia	Sassafras	Water Oak
Water Oak	Maple	Magnolia	Sassafras
Sassafras	Water Oak	Maple	Magnolia
Magnolia	Sassafras	Water Oak	Maple

Day Two

8:30 to 10:00 a.m.	Senior Knowledge Bowl
	Junior Educational Activity
10:00 a.m. to 12:00 p.m.	Senior Forest Evaluation
	Junior Knowledge Bowl
12:15 to 1:15 p.m.	Lunch
1:30 to 3:30 p.m.	Awards Assembly



General Rules and Regulations

I. Participants and Eligibility

- A. 4-H events are open to **active members** of a chartered Alabama 4-H Club that has experiential learning in regularly scheduled and planned meetings. Participation is limited to those members who are actively participating in the 4-H Program and have been a member for a minimum of 90 days.

The Alabama 4-H club year begins on August 1 and ends on July 31. **Age eligibility** is based on the age of the youth prior to January 1 of the Alabama 4-H club year. To be eligible for 4-H, the youth must be 9 years old and not older than 19 years old prior to January 1 of the Alabama 4-H club year. The [Alabama 4-H Age and Eligibility Chart](#) will help families, volunteers, and staff to determine the divisions of 4-H Membership.

Counties may bring as many individual competitors and teams as they choose for the junior and senior divisions, as long as the teams within the same division are coached by different coaches and at different times and locations.

- B. The **four-member** team for each county or club may or may not be designated prior to the state event. Coaches will have the choice of determining who is on the official team from a club or a county, or allowing scores to determine who is on the official team. You must provide this information on the registration form. If **coaches** choose to let the scores determine who is on the official team, they will be notified prior to the Knowledge Bowl event. It is the responsibility of the coach to notify all of their 4-H'ers. **Scores** will be tabulated at the end of the first day. For undesignated teams, the top **four** overall scoring individuals from each county or club will be determined, and these four individuals will comprise the official team. The Knowledge Bowl will be conducted the second day with the official teams.

Please note: Individuals may participate in the invitational; however, each club will have only **one** official team.

- C. Junior teams will participate in Tree Identification, Tree Measurement, Compass Traverse, Insects & Diseases (practice only), Topographic Maps, and Knowledge Bowl.

II. General Contest Rules

- A. Only participants and designated officials shall be within the perimeter of an event. Once a contestant has started an event, he or she will not be allowed to talk with anyone other than a designated official until completion of that particular event.
- B. A team may be composed of either three or four members. Each team member will bring a clipboard, pencil, and calculator. Participants are required to wear long pants and close-toed shoes and are encouraged to wear field clothing and heavy shoes and bring rain gear.
- C. Team scores for each event will be the sum of the three highest scoring team members. The overall team score will be the sum of the team scores from each event. The team with the highest overall team score will be selected to represent Alabama in the National 4-H Forestry Invitational.
- D. Individuals with the highest scores in each event will be recognized.

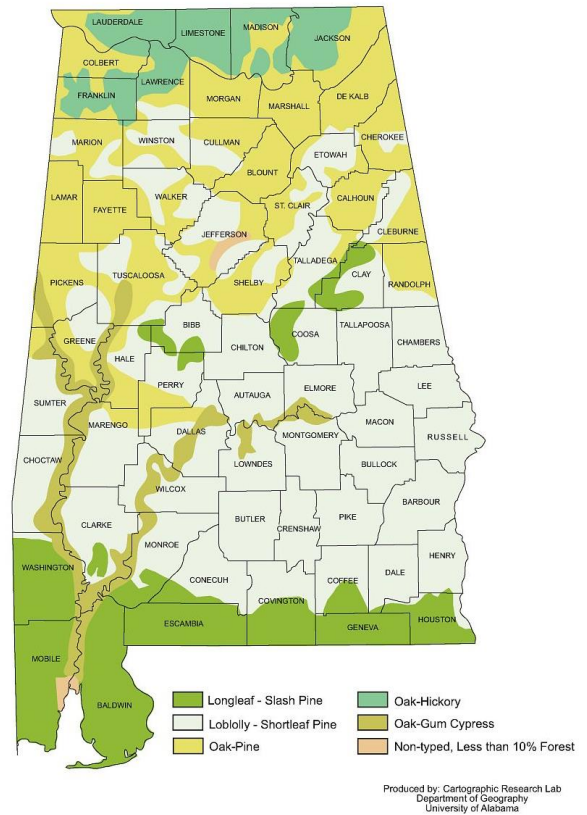
Alabama Forestry Facts

Forestry's Effects on the Alabama Economy

- Forestry is Alabama's #1 industry.
- Alabama's forestry industry generates about \$13 billion annually, with \$1.3 billion in forest product exports in 2016 (Forest Products, n.d.).
- During 2016, four new forestry industries in Alabama were created and 46 current forestry industries expanded. These expansions created 1,005 new jobs in 2016 for Alabama (Chappell, 2016).
- Forest industry investments in 2014 totaled \$641 million (Chappell, 2016).
- There are more than **1,100** forest manufacturing operations in the state. Some of those operations include paper mills, sawmills, wood windows, and door manufacturing by companies such as WestRock, Georgia-Pacific, and Kimberly-Clark. (Forest Products, n.d.).
- In 2014, employment in the forest products sector for Alabama was 25,844 (Alabama's Forest Products Industry, 2015).
- Hunting and fishing, activities which rely heavily on Alabama's healthy forest lands generated more than **\$12 million** for hunting and more than **\$9 million** for fishing in taxes, license fees, hunting rights and equipment sales in 2017. (US Fish and Wildlife Service, 2017)
- The forest industry averages \$800 to \$900 million a year in capital spending in Alabama.
- Forest products exports were valued at more than \$1.3 billion in 2016 (Forest Products, n.d.).

- Alabama forest product companies inject approximately \$1.9 billion into local communities in the form of payroll.

Alabama Forest Types



Forestry Presence in Alabama

- Alabama has the third largest timberland base in the United States, nearly 23 million acres (Chappell, 2016).
- Alabama currently has around 23 billion cubic feet of timber "in the bank."
- There are twice as many trees in Alabama today as there were 50 years ago.
- For every tree harvested in the state of Alabama, five are planted. Each year the South's landowners (industrial and non-

industrial) plant approximately 1.2 billion new trees, an average of 3,288,000 trees per day (Barger, 2016).

- ★ Since 1990, 3,150 trees were planted for every baby that was born.
- ★ In 2016, Alabama forest consist of 44 percent softwood stands (pine), 43percent hardwood, and 13percent mixed pine and hardwood (Chappell, 2016).
- ★ Alabama has four national forests that have 667,000 acres stretched across 17 counties. The four national forests in Alabama are the Bankhead, Conecuh, Talladega, and Tuskegee National Forests (Christenson, 2016).



Source: Chris Evans, University of Illinois, Bugwood.org

- ★ Alabama's four national forests are home to approximately 900 species of birds, mammals, reptiles, amphibians, and fishes, including endangered and threatened species such as the gopher tortoise, eastern indigo snake, and

the red-cockaded woodpecker (Christenson, 2016).

- ★ Eighty-seven percent of Alabama forests are owned by private, non-industrial landowners (Chappell, 2016).
- ★ In a 2016 survey of Alabama's forests, the most common species of tree in Alabama was the loblolly pine; more than 3 million of that species were recorded (Hartsell, 2016).
- ★ Alabama leads the nation in loblolly pine growing stock volume with 504.7 million tons (Chappell, 2016).
- ★ In 2016, the sale of all timber products in Alabama was approximately \$709.4 million (Chappell, 2016).

Forests and the Environment

- ★ One mature tree absorbs carbon dioxide at a rate of 48 pounds per year.
- ★ Two mature trees provide enough oxygen for one person to breathe for a year.
- ★ In one day, one large tree can absorb up to 100 gallons of water and release it into the air, cooling the surrounding area.
- ★ Forests improve public health by keeping pollutants out of lungs by trapping and removing dust, ash, pollen, and smoke.
- ★ A square kilometer of forest can house more than 1,000 species; 68 species of birds rely on longleaf pine forests (the Alabama State Tree) alone.
- ★ More than half of U.S. drinking water originates in forests.

- ✳ Forests help improve water quality by extracting pollutants through tree roots.
- ✳ Conservation buffers are small areas or strips of land in permanent vegetation, designed to intercept pollutants and manage other environmental concerns that includes grassed waterways, windbreaks, etc.
- ✳ Conservation buffers slow water runoff, trap sediment, and enhance infiltration within the buffer.



- ✳ Conservation buffers reduce noise and odor. They are a source of food, nesting cover, and shelter for many wildlife species.
- ✳ Strategically placed buffer strips in the agricultural landscape can effectively mitigate the movement of sediment, nutrients, and

pesticides within farm fields and from farm fields.

- ✳ Riparian buffers can be established along streams, lakes, ponds, and wetlands to improve or maintain water quality and to protect or improve fish and wildlife habitat.
- ✳ Trees and shrubs create cover and nesting habitat. They shed leaves and fallen insects provide the primary food source for aquatic ecosystems .

Other Forestry Facts

- ✳ On average, each person in the United States uses enough tree products each year to make a tree that is 100 feet tall and 16 inches in diameter.
- ✳ One acre of healthy trees can generate approximately 5,600 pounds of wood in 1 year.
- ✳ Alabama's state tree is the southern longleaf pine.
- ✳ Alabama's vast forests would cover Rhode Island, Delaware, Massachusetts, New Jersey, and Connecticut (Kiffell-Alcheh, 2015).
- ✳ Since 2013, the Alabama TREASURE Forest Association (ATFA) is an organization of stewardship-minded men and women dedicated to improving the forest land of Alabama. Forests are managed in a way to ensure the next generation will enjoy the same benefits people receive today (Treasure Forest, n.d.).

- At 17 million acres, the largest forest in the United States is the Tongass National Forest in Alaska (Wee, 2016).

Southern longleaf pine



Source: USDA Forest Service–Region 8–Southern, USDA Forest Service, Bugwood.org

- Alabama is divided into five geographical regions – *three* in the Appalachian Highlands Region, *one* in the Inland Plains Region, and *one* in the Atlantic Plain Region (Amsel, 2017).
- Alabama’s state bird is the northern flicker; the state butterfly is the eastern tiger swallowtail; the state mammal is the black bear; and the state tree fruit is the peach (State Symbols USA, n.d.).
- Alabama has 28 state parks, including Gulf State Park, Wind Creek State Park, Paul M. Grist State Park, etc. (Walker, 2017).
- Alabama has four state forests: Geneva State Forest, Saint Stephens State Forest, Little River State Forest, and the Weogufka State Forest (Walker, 2017).

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Tree Identification

Objectives

Various tree species have differing requirements for good growth. They also differ in use and value. Therefore, you should be able to identify trees of the forest.

Each team member will have the opportunity to identify 25 trees as found in a natural outdoor condition. All trees to be identified will be selected from the official species list below.

Contest Rules

1. Participants are provided with a score sheet and are required to identify tree species based on visual observation. They are scored on the accuracy of identification and the spelling of common names. Scientific names will **not** be required. Incomplete names will be considered incorrect.

Example: Recording “maple” instead of “red maple,” “shortleaf” instead of “shortleaf pine,” “Boxelder” instead of “boxelder,” or “VIRGINIA PINE” instead of “Virginia pine.”

2. Participants are allotted a specific amount of time to identify the tree specimens and record the information on the score sheet.
3. Four points will be awarded for recording the correct common name. One point will be deducted for each common name that is misspelled. Spelling, including capitalization, must be the same as that on the Official Tree Identification Species List to be counted as correct.

American Elm



Source: Richard Webb, Bugwood.org

Flowering dogwood



Source: Chris Evans, University of Illinois, Bugwood.org

Official Tree Identification Species List

<u>Common Name</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Scientific Name</u>
hazel alder	<i>Alnus serrulata</i>	northern red oak	<i>Quercus rubra</i>
American basswood	<i>Tilia americana</i>	overcup oak	<i>Quercus lyrata</i>
American beech	<i>Fagus grandifolia</i>	pecan	<i>Carya illinoensis</i>
American elm	<i>Ulmus americana</i>	pignut hickory	<i>Carya glabra</i>
American holly	<i>Ilex opaca</i>	post oak	<i>Quercus stellata</i>
American hornbeam or blue beech	<i>Carpinus caroliniana</i>	red maple	<i>Acer rubrum</i>
ash	<i>Fraxinus</i> sp.	red mulberry	<i>Morus rubra</i>
Atlantic white cedar	<i>Chamaecyparis thyoides</i>	redbud	<i>Cercis canadensis</i>
baldcypress	<i>Taxodium distichum</i>	river birch	<i>Betula nigra</i>
black cherry	<i>Prunus serotina</i>	sassafras	<i>Sassafras albidum</i>
black locust	<i>Robinia pseudoacacia</i>	scarlet oak	<i>Quercus coccinea</i>
black oak	<i>Quercus velutina</i>	shagbark hickory	<i>Carya ovata</i>
black tupelo or blackgum	<i>Nyssa sylvatica</i>	shortleaf pine	<i>Pinus echinata</i>
black walnut	<i>Juglans nigra</i>	silver maple	<i>Acer saccharinum</i>
black willow	<i>Salix nigra</i>	slash pine	<i>Pinus elliotii</i>
blackjack oak	<i>Quercus marilandica</i>	slippery elm	<i>Ulmus rubra</i>
boxelder	<i>Acer negundo</i>	sourwood	<i>Oxydendrum arboretum</i>
buckeye	<i>Aesculus</i> sp.	southern catalpa	<i>Catalpa bignonioides</i>
cherrybark oak	<i>Quercus pagoda</i>	southern magnolia	<i>Magnolia grandiflora</i>
chestnut oak	<i>Quercus montana</i>	southern red oak	<i>Quercus falcata</i>
common persimmon	<i>Diospyros virginiana</i>	sugarberry	<i>Celtis occidentalis</i>
cucumbertree	<i>Magnolia acuminata</i>	sugar maple	<i>Acer saccharum</i>
eastern cottonwood	<i>Populus deltoides</i>	sweetgum	<i>Liquidambar styraciflua</i>
eastern hemlock	<i>Tsuga canadensis</i>	sycamore	<i>Platanus occidentalis</i>
eastern hophornbeam	<i>Ostrya virginiana</i>	Virginia pine	<i>Pinus virginiana</i>
eastern redcedar	<i>Juniperus virginiana</i>	water oak	<i>Quercus nigra</i>
eastern white pine	<i>Pinus strobus</i>	water tupelo	<i>Nyssa aquatica</i>
flowering dogwood	<i>Cornus florida</i>	white oak	<i>Quercus alba</i>
honeylocust	<i>Gleditsia triacanthos</i>	willow oak	<i>Quercus phellos</i>
live oak	<i>Quercus virginiana</i>	winged elm	<i>Ulmus alata</i>
loblolly pine	<i>Pinus taeda</i>	yellow-poplar or tulip-poplar	<i>Liriodendron tulipifera</i>
longleaf pine	<i>Pinus palustris</i>		
mockernut hickory	<i>Carya tomentosa</i>		

Practice Tree Identification Scoresheet

Name: _____

County: _____

Division: (Circle one) Junior Senior

Club: _____

#	Tree Species (Common Name)
1	
2	
3	
4	
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Additional Resources

Identify America's 100 Most Common Trees & Tree leaf identification Quizzes

<https://www.thoughtco.com/identify-americas-100-most-common-trees-1341836>

National 4-H Forestry Invitational Official Tree Species List

<http://4hforestryinvitational.org/training/tree-identification-contest>

Tree Measurement

Objectives

It is often necessary to measure **standing trees** to estimate the volume of forest products that could be obtained from the trees. Because most timber is bought and sold on a volume basis (usually by the board foot volume), it is a good idea to have some estimate of total **volume per acre** and **volume by product** before selling timber.

Therefore, tree diameters are measured for two primary reasons:

1. Determining stand structure diameter distribution or number of trees by diameter class. That is, what does the stand look like?

2. Estimation of tree volume or weight.

Contest Rules

1. The International ¼-Inch Rule is used to estimate tree volume. A calibrated **tree scale stick**, or Biltmore stick, will be used to measure the tree's diameter at a point 4 ½ feet above the groundline (diameter at breast height); and the merchantable height is calculated in 16-foot logs and 8-foot half-log lengths. Each team is required to furnish their own tree scale stick for the competition.
2. A plot of land (1/10, 1/5, or ¼ acre) will be designated for use in this competition. Participants will be required to record the **total volume** of saw timber on 1 acre as determined from the sample plot volume.
3. Each participant will estimate and record values of each designated tree. **Tree diameters** will be taken to the nearest 2-inch class. **Tree heights** will be taken to the nearest full half-log for sawtimber. A half-log is defined as being 8-feet long. The minimum log will be 10 inches D.B.H., one log merchantable length, and have a minimum top diameter of 8 inches.
4. Each tree volume will be found in the **volume table** furnished to participants. Record sawlog volumes as found in the table. Total all sawlog volume after all designated trees have been estimated.
5. Junior and Senior participants may have different score sheets as appropriate.
 - A. For Seniors, two points will be awarded for each correct species identification, three points DBH, and three for number of 16-foot logs for a possible total of 80 points.
 - B. For Juniors, two points will be awarded for each correct species identification, four points DBH, and four for number of 16-foot logs for a possible total of 80 points.

6. Twenty points will be allowed for the correct sawtimber volume per acre. Remember, the total volume will be the volume per acre as represented by the plot. Point allocation will be 20 for + or - 5% of the official volume, 15 points for + or - 10%, 10 points for + or - 15%, and no points over + or - 15%.
7. Maximum points for this phase are 100.
Example: If 4,000 bd. ft. is the official volume, then 3800 bd. ft. through 4200 equals 20 points; 3600 to 3799 and 4201 to 4400 equals 15 points; 3400 to 3599 and 4401 to 4600 equals 10 points; and under 3400 and over 4600 has no points.

Measurement of Standing Trees

Because the **shape** of a tree is like a cylinder, its volume may be determined by measuring its **diameter** and **height**. Diameter of standing trees are measured by time-honored custom, at 4½ feet above ground on the uphill side of the tree. This is referred to as diameter at breast height, or **DBH**.

The **height** of a standing tree may be measured as **total** (entire height from groundline to the top) or **merchantable**. Merchantable height varies depending on the product that will be cut.

For example, if a tree could produce a **pole** or **piling**, you would measure its height in 5-ft increments.

The **top diameter** is fixed by certain specifications. If a tree is to be cut into logs, its height usually will be measured in 16-foot logs to the nearest half-log.

To measure diameter, you may use a **caliper**, **diameter tape**, or **tree scale stick**. Since the tree scale stick is to be used in the contest, the method of using it will be explained.

The drawing below shows how the tree scale stick is used to find tree diameter. Use the flat side of the stick, labeled as *Diameter of Tree (in inches)*. Hold the stick level at 25 inches from the eye, against the tree, at a height of 4½ feet above ground.

Note: Practice is needed to find both the 4½-foot point in relation to your height and the 25-inch distance to eye. Sight at the left or zero-end.

This and the tree bark should be in the same line. The **zero-end** of the stick is moved so that when you look along the end of the stick, you are looking at one side of the tree at breast height. Now, **DO NOT MOVE YOUR HEAD**. Just move your eye across the stick to the right-hand edge of the tree. Where the line from the edge of the tree to your eye intersects the stick is the measurement of diameter. Read the tree diameter to the nearest even inch. Hold the stick perpendicular to the tree.

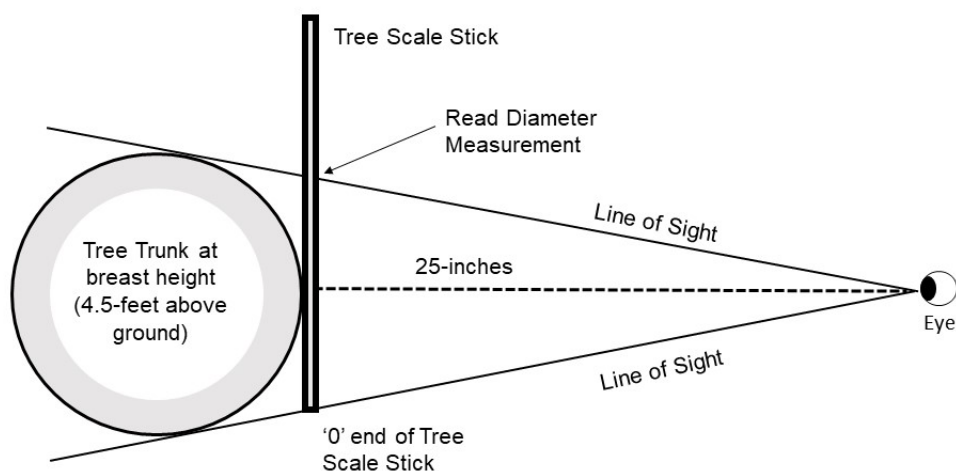


Figure 1. Method of using tree scale stick to obtain tree diameter.

To measure the **merchantable height** of a tree, pace out 66 feet from the base of the tree to a point where the entire tree can be seen. Hold the tree scale stick so that the side labeled as *Number of 16-foot log* faces you. The **zero-end** should point toward the ground. Plumb the stick, at 25 inches from the eye. Sight the zero-end to appear to rest at the stump height. **DO NOT MOVE YOUR HEAD OR THE STICK.** Look up the stock to point where the top of the last merchantable cut would be made in the

tree (8-inch diameter or at the first major fork or other major defect). Read saw logs to the nearest full one-half log.

Note: Practice on pacing is needed to find the 66-foot point. The 25-inch distance from eye to stick is still the same as in measuring tree diameter.

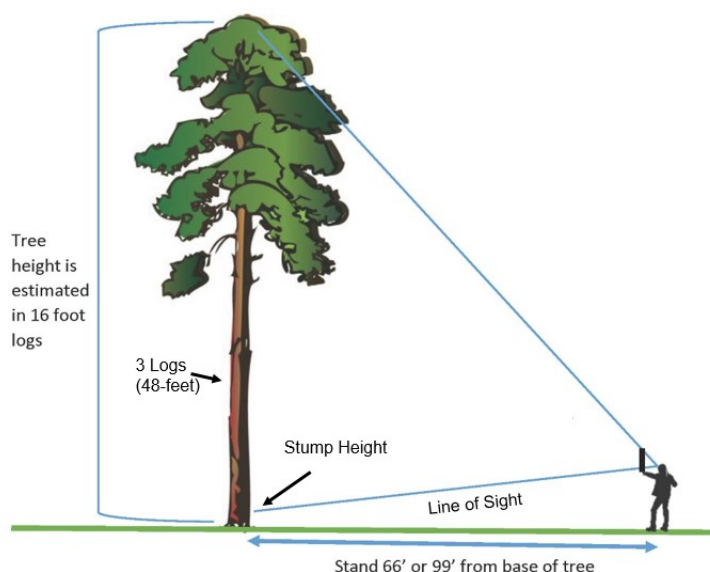


Figure 2. Method of using tree scale stick to obtain tree height.

Using a Volume Table

The volumes listed in the volume table are composites of actual volumes, on an average basis, for the product indicated. Once the tree measurements are determined, read down the left-hand column until you come to the row containing the tree diameter at breast height (DBH). Move across from left to right until you come to the column containing the tree merchantable height at the top. At the intersection of that row and column, you will find the merchantable volume of the tree. Read and record each tree volume directly and separately. **For contest purposes, do not use the volume table on the tree scale stick.**

Volume (board feet) by Number of Usable 16-foot Logs

DBH	1	1.5	2	2.5	3	3.5	4	4.5
10	36	48	59	66	73			
12	56	74	92	106	120	128	137	
14	78	105	132	153	174	187	200	
16	106	143	180	210	241	263	285	
18	136	184	233	274	314	344	374	
20	171	234	296	348	401	440	480	511
22	211	290	368	434	500	552	603	647
24	251	346	441	523	605	664	723	782
26	299	414	528	626	725	801	877	949
28	347	482	616	733	850	938	1027	1114
30	403	560	718	854	991	1094	1198	1306
32	462	644	826	988	1149	1274	1400	1518
34	521	728	934	1119	1304	1447	1590	1727
36	589	826	1063	1274	1485	1650	1814	1974

Practice Tree Measurement Scoresheet- Senior Division

Name: _____
County: _____
Club: _____

#	Tree Species (2 pts.)	DBH (3 pts.)	# of 16 foot logs (3 pts.)	Board Feet
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

**Total board foot
volume in plot =** _____

**Total board foot
volume per acre =** _____

FOR SCORING OFFICIALS ONLY		
(a) subtotal of tree scores =		80 pts. Possible
(b) subtotal of volume per acre =		20 pts. Possible
Total Score (a+b) =		100 pts. Possible

Practice Tree Measurement Scoresheet- Junior Division

Name: _____
County: _____
Club: _____

#	Tree Species (2 pts.)	DBH (4 pts.)	# of 16 foot logs (4 pts.)	Board Feet
1				
2				
3				
4				
5				
6				
7				
8				

**Total board foot
volume in plot =** _____

**Total board foot
volume per acre =** _____

FOR SCORING OFFICIALS ONLY		
(a) subtotal of tree scores =		80 pts. Possible
(b) subtotal of volume per acre =		20 pts. Possible
Total Score (a+b) =		100 pts. Possible

Additional Resources

Make your own tree scale stick:

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick20-04.pdf>

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick23-04.pdf>

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick25-04.pdf>

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick25-04.pdf>

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick25-04.pdf>

<http://4hforestryinvitational.org/training/tree-measurement-contest/ScaleStick25-04.pdf>

How to measure with a Biltmore stick:

<https://www.youtube.com/watch?v=myh-DuR-48g>

Compass Traverse

Introduction

Foresters are often required to estimate ground distances by the pacing method and to determine direction of travel using a compass. This exercise is designed to emphasize pacing and compass work. This will be accomplished by measuring a course of five lines. The lines may be level or slope up or down hill, and successive lines may or may not be continuous.

Pacing is an expedient, but crude, method of determining distance on the ground. It is useful in cruising timber and running out land boundaries. A pace is two full steps. Heel to toe is not acceptable. On level, open ground, pacing can become fairly accurate with enough practice, but on slopes and brushy or rocky areas, its accuracy diminishes. To correct for slope, in pacing, the following suggestions from the Forestry Handbook are provided:

In difficult terrain, no attempt should be made to maintain a standard pace. Instead, allow for its inevitable shortening (downhill as well as uphill) by repeating the count at intervals. For example, on moderate slopes, count every tenth pace twice: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10, 11, etc. On steeper slopes, it may be necessary to repeat every fifth count: 1, 2, 3, 4, 5, 5, 6, etc. On the steepest slopes in very heavy brush, in swamps, or among boulders, every count may have to be repeated. Consistent

accuracy in pacing under such conditions is attained only by practice and is maintained only by constant checking. (Forestry Handbook 1955. Page 17-1.)



Contest Rules

1. Each contestant should determine the number of paces he or she takes per 66 feet on a practice course prior to the contest.
2. Instructions will be given to the participants before beginning the course. The exercise will be completed on an individual basis. Each contestant will measure the azimuth and distance for each line, record the measurements on a score sheet, and return the score sheet to the official in charge.
3. Participants may use only the following equipment:

- A. Silva Ranger-type azimuth compass
 - B. Pencil and clipboard
 - C. Score sheet
 - D. Calculator
4. The course layout will consist of five lines with marked corners. Set compass declinations on zero.
 5. Each contestant will have 20 minutes to complete the course.
 6. A maximum of 20 points is possible for each of the five lines, 10 points for the correct azimuth, and 10 points for the correct distance. One-half point will be deducted for each degree of error in the azimuth up to a maximum of 10 points per line. One-half point will be deducted for each foot of error in distance up to a maximum of 10 points per line. Participants may receive a maximum total score of 100 points.
 7. Participants should fill in the azimuth and distance for each line.
 8. No writing in the box for points.
 9. Distance should be rounded to the nearest foot.
 10. The azimuth should be rounded to the nearest degree.



Figure 1. Silva Ranger Compass

Practice Compass & Pacing Scoresheet

Name: _____

County: _____

Division: (circle one) Junior Senior

Club: _____

Line	Azimuth (Degrees) (10 pts.)	Distance (feet) (10 pts.)
A-B		
B-C		
C-D		
D-E		
E-F		

FOR SCORING OFFICIALS ONLY		
(a) subtotal of azimuth scores =		50 pts. Possible
(b) subtotal of distance =		50 pts. Possible
Total Score (a+b) =		100 pts. Possible

Insect and Disease Identification

Introduction

Different insects have various requirements for food, habitat, and development. We have both beneficial insects and detrimental insects. Insects, or examples of their damage, will be displayed through specimen or photographs/slides. Spelling, including capitalization, must be the same as that on the Official List of Species to be correct.

Participants will be asked to identify diseases that cause excessive dollar loss to the forest industry and society. Specimens will be selected and displayed which are representative of diseases and damage.

Contest Rules

1. Participants will be required to identify twenty insects, disease, or damage specimens selected from the official lists. Participants will be judged on the accuracy of identification and the spelling of the common names. Scientific names will not be required. Incomplete names will be counted as wrong. For example, recording "caterpillar" instead of "eastern tent caterpillar."
2. Participants will be given a specific amount of time to identify each specimen.
3. Five points will be given for each correct common name. One point will be deducted for each misspelled name. The common name must be the one used in the official list.
4. It is recommended that each team bring a magnifying glass.



Figure 1. Gypsy moth larvae. Source: USDA Forest Service

Official Insect Species List

Common Name	Scientific Name
Nantucket pine tip moth	<i>Rhyacionia frustrana</i> (Comstock)
Locust borer	<i>Megacyllene robiniae</i> (Forester)
White pine weevil	<i>Pissodes strobi</i> (Peck)
Gypsy moth	<i>Lymantria dispar</i> (L.)
Eastern tent caterpillar	<i>Malacosoma americanum</i> (Fabricius)
Pine webworm	<i>Tetralopha robustella</i> (Zeller)
Fall webworm	<i>Hyphantria cunea</i> (Drury)
Black turpentine beetle	<i>Dendroctonus terebrans</i> (Oliver)
Ips engraver beetle	<i>Ips</i> spp.
Conifer sawflies	<i>Hymenoptera: Diprionidae</i>
Southern pine beetle	<i>Dendroctonus frontalis</i> (Zimmerman)
Pales weevil	<i>Hylobius pales</i> (Hbst.)
Periodical cicada	<i>Magicicada septendecim</i>



Figure 2. Black turpentine beetle eggs. Source: ACES

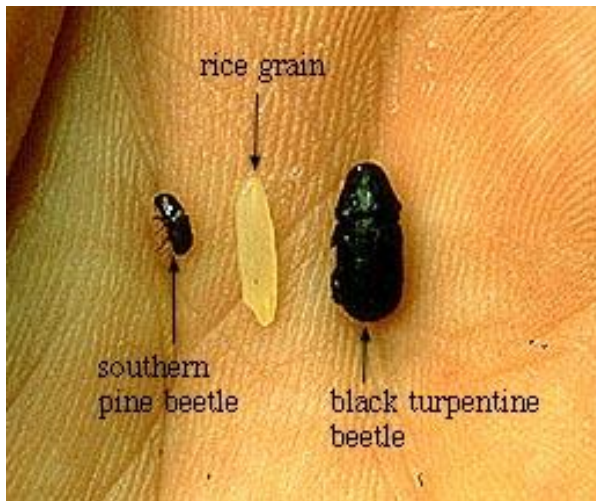


Figure 3. Beetle Comparison. Source: USDA NRCS

Official Disease Species List

Common Name	Scientific Name
White pine blister rust	<i>Cronartium ribicola</i>
Oak wilt	<i>Ceratocystis fagacearum</i>
Chestnut blight	<i>Cryphonectria parasitica</i>
Black knot	<i>Apiosporina morbosa</i>
Nectria canker	<i>Nectria galligena</i> or <i>Nectria magnoliae</i>
Dutch elm disease	<i>Ceratocystis ulmi</i>
Annosus root rot	<i>Heterobasidion irregulare</i>
Brown spot needle blight	<i>Scirrhia acicola</i>
Fusiform rust	<i>Cronartium fusiforme</i>
Cedar-apple rust	<i>Gymnosporangium juniperi-virginianae</i>
Red heart	<i>Fomes pini</i>
Hypoxylon canker	<i>Hypoxylon</i> spp.
Artist conk	<i>Fomes applanatus</i>



Figure 5. Black Knot.
Source: Joseph OBrien, USDA Forest Service, Bugwood.org



Figure 4. Brown spot needle blight.
Source: Joseph OBrien, USDA Forest Service, Bugwood.org

Practice Insects & Diseases Scoresheet

Name: _____

County: _____

Division: (circle one) Junior Senior

Club: _____

#	Species (Common Name)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

References

Gypsy Moth

<https://www.fs.fed.us/ne/morgantown/4557/gmoth/>

Pine Beetles along Alabama's Coast

<http://www.aces.edu/ucf/pinebeetles.php>

Southern Pine Beetle and Black Turpentine Beetle Comparison

https://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcs141p2_017108.jpg

Black Knot and Brown Spot Needle Blight, Joseph O'Brien, USDA Forest Service, www.bugwood.org

Additional Resources

Identifying Pine Plantation Pests:

<http://www.forestry.alabama.gov/PDFs/Pine%20Pest%20Field%20Guide.pdf>

General forest disease and insect training videos can be found at www.alabama4h.com.

Topographic Maps

Objectives

Topographic maps are a graphic portrayal of forests and natural land features on the ground. They provide information about a geographic location such as the terrain, water resources, how the land is used, the presence of infrastructure like roads, and distance on the ground between points of interest. When you are managing forest resources, these are important factors. Though many technologies exist that can be used for examining forested land and associated features, it is important that you have the ability to interpret maps and have a broader understanding of landscapes.

Each team member will have the opportunity to identify symbols and land features shown on a topographic map, calculate the change in elevation between two points on a map, measure the distance between two points on a map, and determine the line of travel between two points on a map. All symbols and land features to be identified will be selected from the official list.

Contest Rules

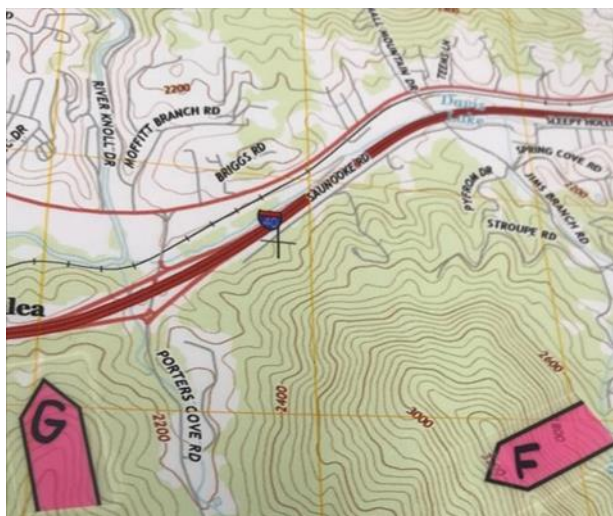
1. Instructions will be given to the participants before beginning the exercise. They will complete the exercise within an allotted amount of time and on an individual basis. Participants are provided with a score sheet and are required to identify map symbols and land features, calculate elevations, measure distances, determine bearings, and record the information on the score sheet.
2. Each contestant will identify marked map symbols and land features based on visual observation of a map. They are scored on the accuracy of identification and the spelling of the names (no deductions for capitalization). Incomplete names will be considered incorrect. 2 points will be awarded for each correct name, for a total of 10 points possible. 1 point will be deducted for a spelling error. Example: Recording "highway" instead of "primary highway," "contour index line" instead of "index contour line," "unimproved Rd." instead of "unimproved road".
3. Each contestant will observe 2 points of interest that are marked on a map and calculate the change in elevation between the two points. Refer to the bottom of the map for the contour interval. This is worth 10 points. No partial credit will be given.
4. Each contestant will determine the distance between 2 marked points of interest on a map by using a ruler to measure the distance and converting it to feet using the scale at the bottom of the map. Answers should be rounded to the nearest 100 foot. This is worth 10 points. No partial credit will be given.
5. Each contestant will determine the bearing, or line of travel, between 2 marked points of interest on the map using an azimuth compass. Correct answers are within +/- 2 degrees accuracy and are worth 10 points.

5. Participants may only use the following equipment:
 - a. Silva Ranger-type azimuth compass
 - b. Pencil
 - c. Ruler
 - d. Magnifying glass
 - e. Score sheet
 - f. Calculator
6. Participants will be provided with:
 - a. 7.5 Minute Series Map
 - b. Ruler
 - c. Calculator
 - d. Magnifying glass
 - e. Score sheet
7. Participants may receive a maximum total score of 50-points.

Change in Elevation

The first step in determining the change in elevation between two points on a map is to identify the contour interval of the map (ex: 20-feet). This tells you elevation height (ft.) between each contour line.

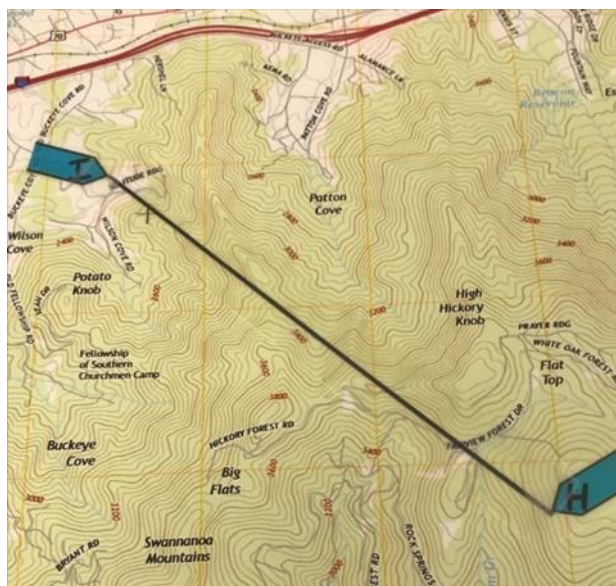
The second step is to determine the elevation (ft.) for each point of interest. Lastly, you will subtract the difference of the two. This gives you the change in elevation between one point and another.



Measuring Distance

Knowing the distance between two points on the ground can be useful in land management. Using a topographic map and a ruler, you can estimate distance. The first step is to identify the scale of the map (ex: 1:24 000).

Next, hold your ruler flat on the map and parallel with the line. Record the distance of your line in inches. Using the map scale, you can convert the inches to feet. i.e. a map with a scale of 1:24 000 indicates that 1 inch on the map is equivalent to 24,000 inches on the ground. 24,000 inches equals 2,000 feet, so multiplying the distance you measured with your ruler by 2,000 will give you the correct distance between two points on the ground in feet.

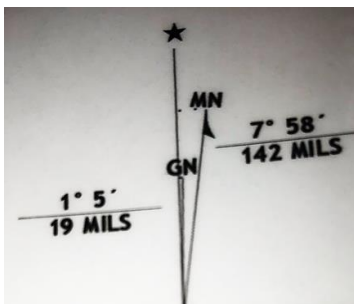


Line of Travel

A compass can be used with a topographic map to determine the bearing between two points, or line of travel. The steps are as follows: 1) lay the compass flat on map and parallel with line of travel (mirror points in direction of travel) 2) Turn compass dial so that its meridian lines are exactly parallel with any meridian line on the map (with your N pointing north) 3) Read the bearing at the compass index pointer (white line near mirror) 4) Record the bearing (azimuth) in degrees.



Because a compass needle points to Magnetic North, while maps and directions are based on True North, the bearing needs to be corrected to account for the magnetic declination. The amount of declination of a point on a map is dependent upon its location in North America.



- 1) Locate the declination angle on the map (bottom). True North is the line with star (TN) and the Magnetic North (MN) line is either on the left or right of TN depending upon your map quadrangle.
- 2) If MN points to the left or west of True North, you will add the degrees listed on the declination angle to the bearing. 3) If MN points to the right or east of True North, you will subtract the degrees from the bearing. 4) Record the corrected bearing (azimuth) in degrees.

Map Symbols

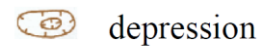
Colors and different types of symbols are used to represent important features on topographic maps such as boundaries, surface and below-surface features, and contours. Locations of water resources, prominent land cover, and placement of infrastructure such as a dam, are all examples of information that can be obtained from map observation. Thus, topographic maps provide information that is useful for managing land, conducting environmental assessments, and timber harvest planning. Common symbols may be used among topographic maps in production; however, some symbols may slightly vary and some are useful only for certain geographic locations. The official list of map symbols for the contest are as follows:

1. Ridge
2. Valley
3. Peak
4. Saddle
5. Depression
6. Woodland
7. Building
8. Open area
9. Campground
10. Primary highway
11. Marsh
12. Unimproved road
13. Cemetery
14. Bridge
15. Trail
16. Perennial stream
17. Intermittent stream
18. House of worship
19. Quarry
20. Spring
21. Railroad-single track
22. Index contour line
23. Intermediate contour line
24. Masonry dam
25. Large rapids

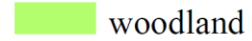
Many of these symbols are displayed on the National 4-H Forestry Invitational training page and are available in a [printable PDF](#). Other useful resources for exploring and studying topographic maps are www.natgeomaps.com and www.topozone.com.



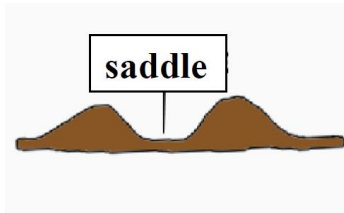
valley



depression



woodland



open
area



ridge



marsh

peak



intermittent
stream



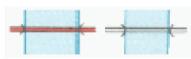
index
contour line



spring



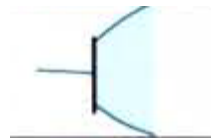
perennial
stream



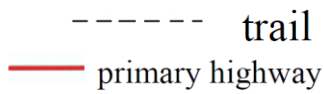
bridge



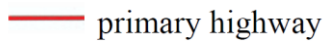
Large
rapids



Masonry
dam



trail



primary highway



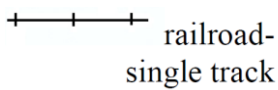
unimproved road



quarry



campground



railroad-
single track



building



house of worship

Practice Topographic Map Scoresheet

Name: _____

County: _____

Division: (circle one) Junior Senior

Club: _____

Part I. Identify the Map Symbol or Feature (2 pts.)

A	
B	
C	
D	
E	

Part II. Determine the distance on the ground between H and I (10 pts.):

= _____

Part III. Determine the bearing of the line from H to I (10 pts.):

= _____

Corrected bearing (10 pts.) = _____

Part IV. Calculate the change in elevation between F and G (10 pts.):

= _____

Forest Evaluation

Objectives

This contest has been developed to provide senior forestry teams an opportunity to discover the site factors and stand factors that affect the growth of forest crops. The competition is divided into four parts:

- I. Site Evaluation
- II. Stand Evaluation
- III. Recommended Practices
- IV. Forest Inventory



Contest Rules

1. Senior forestry teams will complete the forest evaluation contest as a **group**. This is not an individual event.
2. Teams are given a specific amount of time to complete each part of the contest.

3. Seventy-five points are possible for each part, with a total of 300 points possible for the entire contest.

- A. For Part I, sections A, B, C, D, and E have a possible value of 15 points each.
- B. For Part II, sections A, B, C, D, E, and F have a possible value of 12.5 points each.
- C. For Part III, each correct answer is worth 5 points.
- D. For Part IV, each correct answer in species, DBH, number of logs, volume, and crown class is worth 3 points.

I. Site Evaluation

The **site** is the habitat or environment in which a plant or plant community lives. A number of site factors determine its desirability as a location for tree species. These factors include **soil depth**, **slope percent**, **aspect**, and **slope position**. These factors can be used to determine the forestland capability class of a particular tract of land.

Soil depth is the distance from the soil surface down to unweathered rock or an impermeable layer, which restricts water movement and root penetration. For contest purposes, **shallow soils** are less than 24-inches deep, and deep soils are greater than 24-inches deep.

Slope is the change in elevation between two points, and slope percent is the number of feet of rise or fall in 100 feet of horizontal distance.

Slope percent can be measured with an Abney level or a clinometer. For contest purposes, slope percent is broken into the following categories:

- 0 to 20%
- 20 to 40%
- 40% and greater

Slope percent formula:

$$\text{Slope} = (\text{change in elevation/horizontal distance}) \times 100$$

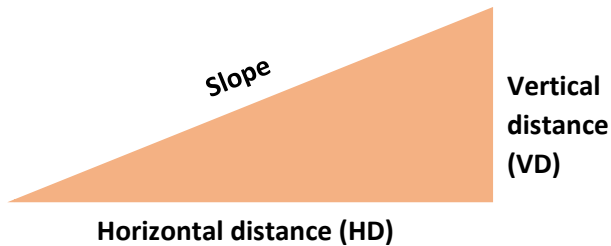
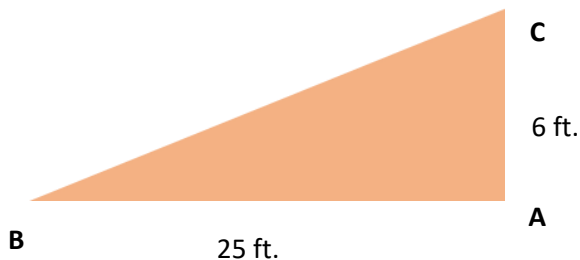


Figure 1. Diagram of slope

Example:



$$\begin{aligned}\text{Slope} &= (AC/AB) \times 100 \\ \text{Slope} &= (6/25) \times 100 = 24\%\end{aligned}$$

Aspect is determined by taking a compass reading while facing down a slope and is measured clockwise. The direction water would run gives the compass direction. Any slope facing north and east of a line extending from 315°NW to 135°SE is considered to have a desirable northeast exposure. Any slope facing south and west of the same line is considered to have a less desirable southwest exposure.

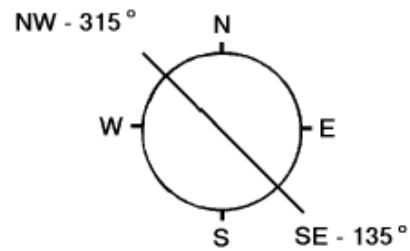


Figure 2. Method of determining aspect.

Slope position is determined only on hilly sites. The positions are classified as **upper 1/3**, **middle 1/3**, and **lower 1/3**. Ridge tops or level plateau and bottomlands are classified separately in land capability.

Forest land capability classes are described below for the purpose of this contest:

Class I- Excellent has few limitations for tree growth. Most sites have little slope and no erosion problems. The soil is fertile and holds water well. It is well drained, but not droughty. These sites will produce timber well.

Class II- Good is usually gently sloping. In some cases, there are drainage problems that affect tree growth.

Class III- Fair may be fairly steep. Soils may have low fertility and tend to be droughty.

Class IV- Poor may be very steep with shallow soil. Sites may be rocky, shady, have low fertility and be very dry.

II. Stand Evaluation

For the purpose of the contest, **grazing damage** is defined by the following three categories:

- Severe:** reproduction eaten and trampled out, soil compacted, and bark rubbed off large trees
- Slight:** animals have only slightly affected the condition of the forest
- None:** no evidence of grazing damage

Fire may be present as a destructive agent or a management tool. **Wildfire** can be very destructive, particularly in hardwood forests. Destruction of the litter layer on the forest floor, crown scorch or burning of the foliage, and scalds or scars on the tree trunk are all evidence of wildfire damage. A **prescribed burn** is a forest management tool that can be used to manage competing vegetation, prevent fuel accumulation, and improve wildlife habitat without damaging the crop trees.



Source: USDA Forest Service Southern Research Station, USDA Forest Service, SRS, Bugwood.org

Forest types have been defined by the Society of American Foresters since 1932. The recognition of forest types is necessary because different forest types require different management. For the purpose of this contest, **size distribution** is classified into four categories for the purpose of this contest:

- Reproduction:** stems 0 to 1-inch DBH
- Saplings:** stems 1 to 3-inches DBH
- Poles:** stems 3 to 12-inches DBH
- Sawtimber:** stems more than 12-inches DBH

Note: In all-aged stands, there may be two or more size classes represented. In many even-aged stands, there will be only one size class.

For the purposes of this contest, specific **forest types** are defined by these general categories:

- pine**
- pine-hardwood**
- upland hardwood**
- bottomland hardwood**



Source: USDA Forest Service Southern Research Station, USDA Forest Service, SRS, Bugwood.org

Stand origin can vary from one stand to another, even though the stands are of the same forest type and size distribution. Timber stands may originate by several different means. Natural stands may arise from seed or from sprouts. Sprout or coppice forests can become unhealthy because disease and decay organisms are sometimes transmitted from the parent trees to the sprouts through the root systems. Stands which originate from planted seedlings or seeds are called **plantations**. These stands may be of higher quality than their predecessors, if genetically improved seeds or seedlings are used.

Stocking is a term used to describe how well the trees in a stand utilize the available space. A **well-stocked** stand is one in which the trees are well distributed, and all the space is utilized, but the trees still have room to grow. An **understocked** stand is one in which there are open spaces between the tree so that the stand will not produce its full potential. An **overstocked** stand is one which

is so crowded that trees are growing very slowly, and so are dying because of too much competition.

III. Recommended Practices

A list of forest practices appears on the Forest Evaluation Contest Score Sheet. Teams should consider each practice, and answer “yes” if they recommend applying the practice in the designated timber stand or “no” if they don't recommend it. The practices recommended should be those that will improve the stand and enhance multiple uses.

Streamside Management Zone (SMZ) applies to an evaluation site with a flowing stream within the boundaries.

IV. Forest Inventory

- A. Species of each numbered tree should be listed using the common names from the Official Tree Identification Species List.
- B. Diameter at breast height of each tree should be measured and recorded in 2-inch diameter classes.
- C. Height in 16-foot logs of each tree should be measured and recorded to the half-log.
- D. Volume in board feet of each tree should be determined and recorded using the provided volume table.
- E. Crown class of each tree should be determined and recorded as either dominant, co-dominant, intermediate, or suppressed (as defined in the glossary).



Source: David J. Moorhead, University of Georgia, Bugwood.org

Practice Forest Evaluation Score Sheet

Forest Evaluation Contest Score Sheet

County or Club _____

Total Score _____

- I. SITE EVALUATION: Circle (A) Depth, (B) Slope percent, (C) Aspect, and (D) Slope Position as they apply to the area.

A. Depth of Soil	DEEP-24" OR MORE						SHALLOW-LESS THAN 24"					
B. Slope Percent	Rolling 0-20 %		Steep 21-40 %		Very Steep 41%+		Rolling 0-20 %		Steep 21-40 %		Very Steep 41 %+	
C. Aspect	NE	SW	NE	SW	NE	SW	NE	SW	NE	SW	NE	SW
D. Slope Position												
Bottom	I	II	I	II	I	II	I	II	I	III	II	III
Lower 1/3	I	II	I	II	I	III	I	III	II	III	III	IV
Middle 1/3	I	II	II	III	II	III	II	III	III	IV	IV	IV
Upper 1/3	II	III	III	III	IV	IV	III	IV	III	IV	IV	IV

E. Land Capability Class - determine the proper class by drawing a line down from the Aspect circled and across from the Slope Position circled. The number where these lines intersect indicates the capability class. Circle the proper class below.

1. Excellent 2. Good 3. Fair 4. Poor

Part I Score _____

- II. FOREST STAND EVALUATION: Check the correct answers.

A. Grazing Damage Severe _____ Slight _____ None _____	D. Forest Type Pine _____ Pine- _____ Hardwood _____ Upland _____ Hardwood _____ Bottomland _____ Hardwood _____	E. Stand Origin Seed _____ Sprout _____ Plantation _____
B. Fire Unburned _____ Wildfire _____ Prescribed _____ Fire _____		F. Stocking Well-stocked _____ Understocked _____ Overstocked _____
C. Size distribution: (There may be more than one answer) Reproduction _____ Sapling _____ Pole _____ Sawtimber _____		

Part II Score _____

III. PRACTICES RECOMMENDED: (Write yes or no in each blank)

1. Leave alone to grow.....
2. Thin stand for pulpwood, fuelwood or other products leaving desirable trees to grow.....
3. Fence area from livestock.....
4. Have timber marked and estimated for harvest cutting.....
5. Cut mature trees with farm labor for home use or sale.....
6. Kill wolf trees, by girdling or injection, to provide sunlight for natural reproduction. Where wolf trees can be utilized, harvest instead of killing.....
7. Cut heavily leaving seedtrees to restock the area.....
8. Remove poorly formed and undesirable trees from stand.....
9. Remove diseased and damaged trees from stand. If a seed source is not available, replant the area.....
10. Remove vines causing damage to trees.....
11. Plant open areas with recommended trees.....
12. Stream Side Management Zone (SMZ) should be recommended
13. Protect area from wildfire. Report fires that occur.....
14. Provide food, cover and water for wildlife.....
15. Prescribed burning is recommended.....

Part III Score _____

IV. FORESTRY INVENTORY

Tree No.	Tree Species	Diameter (DBH)	Height in 16 ft logs	Bd ft Volume	Crown Class

Part IV Score _____

Forestry Quiz

Objectives

The primary objective of the 4-H Forestry Quiz is to provide an opportunity for youth enrolled in 4-H Forestry projects to demonstrate their knowledge of forestry and related subject matter.

Contest Rules

1. Participants will complete the Forestry Quiz on an individual basis.
2. The quiz will consist of true-or-false and multiple-choice questions. Participants should circle the correct answer to each question.
3. Points will be awarded for each correct answer. The maximum number of points possible will be 100.
4. Participants will have thirty minutes to complete the quiz.
5. All questions on the quiz will come from the following references:
 - a. Alabama Forestry Invitational State Manual & Study Guide
 - b. National 4-H Forestry Invitational Training Unit A – Trees
<http://4hforestryinvitational.org/training/unitA.pdf>
 - c. National 4-H Forestry Invitational Training Unit B – Forests
<http://nrem.okstate.edu/Extension/Judging/UnitB.pdf/>

Forestry Knowledge Bowl

Objectives

The Forestry Knowledge Bowl will provide an opportunity for teams of four participants to demonstrate their knowledge of forestry and related subject matter in a competitive setting where attitudes of friendliness, fairness, and excitement prevail.

Pairings for the competition bracket will be determined by the total of the top three quiz scores for each team. The team with the highest total score will be the top seed, while the team with the lowest total score will be the bottom seed.

Equipment

Panels: Two interconnecting panels, each to accommodate four participants plus a moderator panel with suitable controls are to be used. The equipment will be checked prior to the start of each round of competition.

Time keeping device: A stop watch or other appropriate device is to be used.

Score keeping device: This may be a blackboard or flip chart.

Questions: A packet of questions for each round shall be prepared in advance. If there are several acceptable answers to question, all answers shall be listed.

Setup: See the diagram on page 34 for a sample Forestry Knowledge Bowl contest setup.

Official

Moderator (Quiz Master): The moderator assumes complete direction of all rounds, asks all questions, designates participants to answer questions, accepts or reject all answers unless overruled by the referee judges, but may seek interpretation of questions that are ruled on unanimously.

Referee Judge: One or two judges may be used.

Timekeepers: One or two timekeepers will be used to indicate to the moderator the expiration of the time allowed in which to answer questions. The timekeepers may be one or both of the referee judges.

Scorekeepers: One or two individuals will keep score on each round.

Procedure of Play

Starting the Contest

1. Teams are assembled and seated at their respective panels. A team must have three members to be an official team.
2. The team captains shall be seated nearest the moderator.
3. The question packet is opened by the moderator.

Part I

1. A coin is tossed to determine which team captain will answer the first question.
2. The second question will be answered by the captain of the opposing team. The succeeding questions will be asked alternately of each team and rotated among team members until all questions have been asked.
3. Only the designated team member may answer the question. The member has **10 seconds** to begin the answer.
4. If the answer is correct, **10 points** will be awarded the team. **No points** will be given for partial or incorrect answers.

Part 2

1. Part 2 begins with the moderator reading a toss-up question (as with all succeeding questions) until a contestant activates a buzzer.
 - a. If a buzzer is activated during the reading of any question, the moderator immediately will cease reading the question and the contestant activating the buzzer shall begin the answer based on that portion of the question read.
 - b. If the answer given is incorrect or no answer is given, 5 points are taken from that team's score and the moderator repeats the question. The opposing team then

has 10 seconds for any member to activate the buzzer and answer the question. If the answer is incorrect, 5 points will be taken from that team's score. No team consultation is permitted.

2. At the completion of the reading of a question or when a buzzer is activated, 10 seconds are permitted in which to begin an answer. The answer will be given by the contestant activating the buzzer. No consultation on toss-up questions is permitted. It shall be the responsibility of the moderator to determine if an actual answer is started within this 10-second period.
3. If the time in which to answer a question elapses without a contestant activating the buzzer, the question is discarded.

Completing the Contest

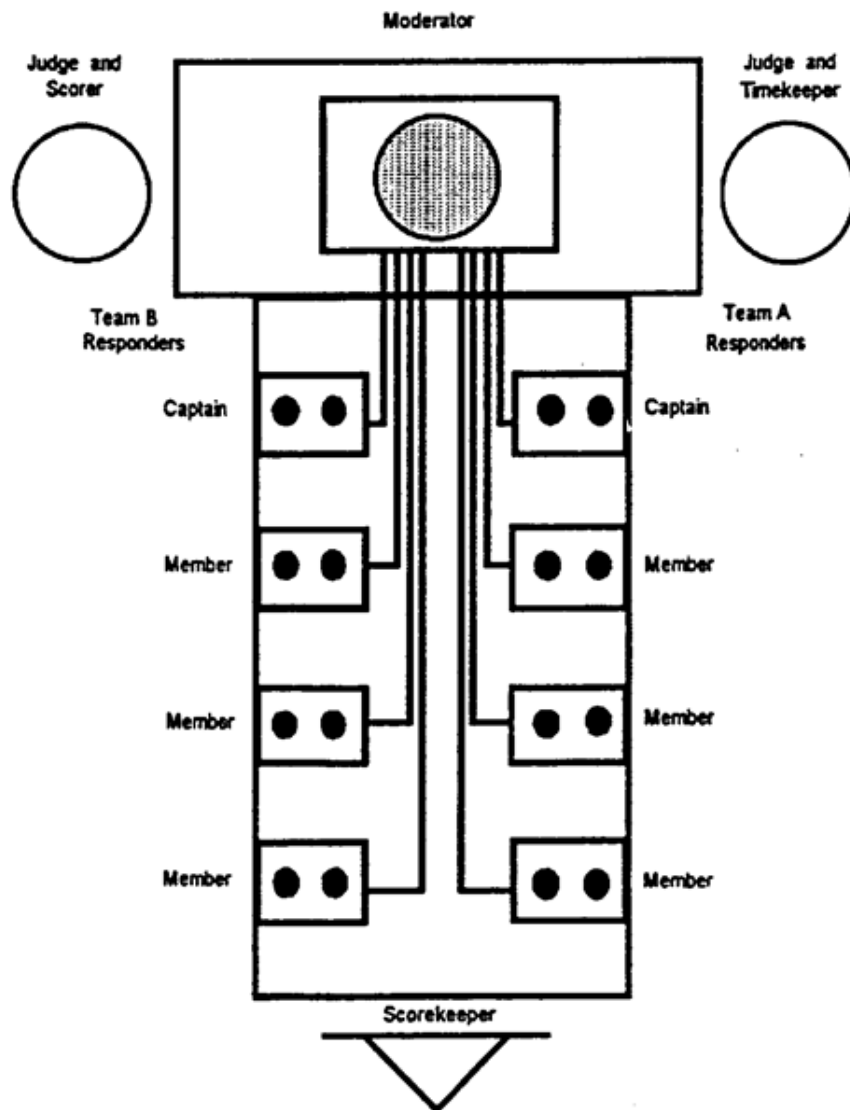
1. The moderator will continue reading toss-up questions until all tossup questions have been asked or 30 minutes have elapsed, whichever comes first (except the last round which may last up to 45 minutes).
2. Following the final question, the scores of the two scorekeepers shall be compared. If there is disagreement as to the score of the game, the score that is tabulated on the written score card will be used.



Contest Rules

1. Instructions will be given to the participants before beginning the exercise. They will complete the exercise within an allotted amount of time and on an individual basis. Participants are provided with a score sheet and are required to identify map symbols and land features, calculate elevations, measure distances, determine bearings, and record the information on the score sheet.
2. Each contestant will identify marked map symbols and land features based on visual observation of a map. They are scored on the accuracy of identification and the spelling of the names (no deductions for capitalization). Incomplete names will be considered incorrect. 2 points will be awarded for each correct name, for a total of 10 points possible. 1 point will be deducted for a spelling error.
Example: Recording “highway” instead of “primary highway,” “contour index line” instead of “index contour line,” “unimproved Rd.” instead of “unimproved road”.
3. Each contestant will observe 2 points of interest that are marked on a map and calculate the change in elevation between the two points. Refer to the bottom of the map for the contour interval. This is worth 10 points. No partial credit will be given.
4. Each contestant will determine the distance between 2 marked points of interest on a map by using a ruler to measure the distance and converting it to feet using the scale at the bottom of the map. Answers should be rounded to the nearest 100 foot. This is worth 10 points. No partial credit will be given.
5. Each contestant will determine the bearing, or line of travel, between 2 marked points of interest on the map using an azimuth compass. Correct answers are within +/- 2 degrees accuracy and are worth 10 points.
6. Each contestant will correct the bearing, or line of travel, to account for magnetic declination. Refer to the declination diagram at the bottom of the map. This is worth 10 points. No partial credit will be given.
7. Participants may only use the following equipment:
 - a. Silva Ranger-type azimuth compass
 - b. Pencil
 - c. Ruler
 - d. Magnifying glass
 - e. Score sheet
 - f. Calculator
8. Participants will be provided with:
 - a. 7.5 Minute Series Map
 - b. Ruler
 - c. Calculator
 - d. Magnifying glass
 - e. Score sheet
9. Participants may receive a maximum total score of 50-points.

Suggested Bowl Setup



Forestry Bowl Bracket Diagram



Please note: The bracket is determined by the total of the top three **Forestry Quiz** scores for each team.
Highest total score = top seed
Lowest score = bottom seed

Glossary

Abney Level – An instrument used to determine the percent of slope of a site.

Acre – An area of land measuring 43,560 feet. A square 1-acre plot measures 209 feet by 209 feet, a circular acre has a radius of 117.75 feet.

Annual Ring – the combination of one earlywood layer (light colored) and one latewood layer (dark colored) seen in a cross-section of a tree. One annual ring usually represents one year of growth.

Aspect – A compass reading taken facing down a slope in the direction water would run, gives the compass direction of a slope.

Best Management Practices (BMP) – A practice or combination of practices that is determined by a state to be the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources (such as managed forests) to a level compatible with water quality goals.

Biltmore Stick (Tree Stick) – A stick similar to a yardstick in appearance, but usually about 25 inches long. One side is scaled to read a tree's diameter by holding the stick horizontally at arm's length and against the tree at breast height. A Merritt hypsometer runs along one edge of the stick and is scaled to read a tree's height from 66 feet away from the tree's base. These two measurements are then used to find the tree's volume according to the volume table printed on one face of the stick.

Biodiversity – The variety of life forms in a given area. This can be categorized in terms of number of species, variety of plant and animal communities, genetic variability, or some combination of these categories.

Clinometer – Height measuring device.

Co-Dominant – Trees with crowns that form the general level of the crown cover and receive full light from the top, but very little from the sides.

Conservation – Gifford Pinchot, a turn of the century forester closely associated with President Theodore Roosevelt, applied the word to describe a natural resource philosophy. It meant "wise use." Through the years it has taken on an extended meaning that says "wise use over a period of time." The time factor forces us to consider the consequences of current use compared to future use.

Coppice – A stand of forest originating from the stumps or roots of trees previously cut. Most hardwood species sprout readily when cut young. Very few conifers will sprout from the stump.

Cull – Tree or log of merchantable size, but no market value.

Crown Class – Tree crowns are classified as to the position in which they are found. The following are the main generally recognized classes.

Deciduous – A group of trees that lose all of their leaves every year.

Dendrology – The study of trees; tree identification.

Dominant – Trees with crowns that extend above the average of the tree crowns and receives light from directly above and some from the sides.

DBH – Diameter of a tree at breast height or 4½ feet above ground.

Duff – Often referred to as litter that is made up of materials of the upper layer of the forest floor. This includes freshly fallen leaves, twigs, and slightly decomposed organic matter.

Erosion – The wearing away of the soil and minerals by climatic agents such as wind and water.

Evergreen – A group of trees that do not lose all of their leaves every year but go through a gradual replacement by dropping only their oldest leaves

each year. Instead of being bare in winter, these trees have leaves all year.

Exposure – That portion of the slope that is directly in the path of wind, rain, and sun. That part of a slope open to action of the elements.

Forest Land Capabilities – The productivity of the land as it is affected by particular location or position on a slope.

Forest Management – Caring for a forest so that it stays healthy and vigorous and provides the products and values the landowner desires.

Forest Types – A classification of species indicating the majority of the species represented in an area.

Forestry – The art and science of managing forests to produce various products and benefits including timber, wildlife habitat, clean water, biodiversity, and recreation.

Germination – This process occurs when viable seed meet favorable conditions that will allow it to grow.

Girdle – To chop or remove a strip of bark or a section of wood containing the food-carrying tissue of a tree in an even strip from the perimeter of the tree or twig.

Harvest – The removal of marketable products from the forest.

Intermediate – Trees that are shorter than the two preceding classes but with some branches extending into the general crown cover. Receives little light from above and none from the sides.

Mature Tree – A tree that has reached a maximum growth that the forest manager decides is a merchantable product.

Multiple-Land-Use – A term used to indicate the management of timber, wildlife, and recreation in an integral, consolidated program.

Merchantable Height – A term used to indicate the marketable length of a tree.

National Forests – These differ from National Parks in that recreation is not their only use. Recreation may be a primary use in some part of the national forest. For example, there are more acres of wilderness areas in national forests than national parks. The national forest system administers 154 forests and 19 grasslands. On most national forest land, timber, water, wildlife, recreation, and grazing are compatible resources. These are managed for productive and sustained yields according to the land's capability.

National Parks – The National Park Service was established by Congress to promote and regulate the use of national parks, monuments, and reservations and to conserve the scenery and the natural and historic objects and the wildlife therein. The Park Service administers 295 separate areas. The Service manages some areas for historical or recreational uses. Each of the 35 national parks was established to preserve a unique natural area for enjoyment and study. National parks are confused with national forests.

Old Growth – This term describes eastern forests and virgin western forests with trees aged older than 100 years.

Partial Cut – Method of cutting mature trees, such as shelterwood cut, selection cut, or seed tree cut.

Pole – A young tree that is 3 to 12 inches DBH.

Prescribed Burn – Controlled burning to enhance forest management techniques in silviculture, wildlife management, fire hazard control, etc.

Preservation – In natural resources, other than wood preservation, this term is related to land use. The meaning stems from 19th century land reserves wherein areas and resources were set aside for limited or restricted use and development. Preservation often restricts land to recreation or scientific study. Preservation may be contrasted to the principle of multiple uses which rather intensively develops one or more of an area's resources.

Reforestation – Reestablishing a forest by planting or seeding an area from which forest vegetation has been removed.

Reproduction – A natural establishment of seedlings or sprouts 0 to 1 inch DBH.

Residual Stand – That portion of trees left after any partial cut.

Rotation – The number of years required to establish and grow trees to a specified size, product, or condition of maturity. A pine rotation may range from as short as 20 years for pulpwood to more than 60 years for sawtimber.

Sanitation Cutting – The removal of dead, damaged or susceptible trees, essentially to prevent the spread of pests or pathogens and so promote forest hygiene.

Sapling – A young tree less than 3 inches DBH. The minimum size is usually placed at 1 inch DBH.

Seedling – A tree grown from seeds.

Silviculture – A term used to indicate the establishment, development, care, and reproduction of stands of timber.

Site – The combination of biotic, climatic, and soil conditions with the ecological factors of an area to product forests or other vegetation.

Slope Position – A particular location on a slope as upper, middle, or lower slope; ridge top; or bottom land. A specific topographic location.

Snag – A standing dead or dying tree.

Sprout – A tree originating from a root or stump.

Stocking – A measure of the proportion of the area actually occupied by trees.

Streamside Management Zone (SMZ) – A strip of land adjacent to a water body or stream channel

where soils, organic matter, and vegetation are managed to protect the physical, chemical, and biological integrity of surface water adjacent to and downstream from forestry operations. Also may be called a "filter strip" or "buffer zone."

Suppressed – Trees with crown entirely below the general crown level and receiving no direct light either from above or below.

Sustained Yield – Management of a forest stand to provide a constant supply of timber and revenue.

Timber Stand Improvement (TSI) – Any practice designed to improve a stand of timber by removal of vines, culls, and undesirable species.

Wilderness – In the strictest sense, this means an area that has never been developed by humans. A 1964 Wilderness Act defined it thus: "A Wilderness, in contrast with those areas where man and his own works dominated landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor and does not remain." In common use, the word is associated with these undeveloped areas and those set aside with little development. In some cases, human-made items are dismantled to reduce the area to a primitive state. Under these broader uses, some road-less areas are considered wilderness when the access is limited to hiking, canoeing, or horseback riding and the use is set aside for recreation. To most of the general public, wilderness experiences are gained in a number of settings involving wild but not necessarily true wilderness areas.

Wild Fire – Fires burning out of control regardless of how or why they are started.

Wolf Tree – A tree that occupies more than its fair share of growing space.

Federal Laws Affecting Forestry

Laws form the basis for using and managing the nation's forests. Since 1890, more than 140 laws affecting forestry have been passed by the United States Congress and signed by the president. In the early years, most laws enabled or authorized the protection and management of the nation's forests. Many of the laws passed in recent years restrict or regulate the use and management of these forests. Some of the more important federal laws are described below.

Creative Act of 1891 – Authorized the president of the United States to set aside public lands bearing forests as public reservations commonly called Forest Reserves.

Organic Administration Act of 1897 – Provided the Forest Reserves, later to be called National Forests, were established to improve and protect the forests, to secure favorable conditions of water flow, and to furnish a continuous supply of timber.

Transfer Act of 1905 – Transferred the administration of the Forest Reserves from the United States Department of the Interior to the United States Department of Agriculture.

Twenty-five Percent Fund Act of 1908 – Established the procedure for paying the states 25 percent of the monies received from national forest timber sales to benefit public schools and public roads in counties where national forests are located. These payments are made in lieu of taxes.

Weeks Law of 1911 – Authorized purchasing and adding to the National Forest System forested, cut-over, or denuded lands within the watersheds of navigable streams which are necessary to regulate the flow of navigable streams or to produce timber.

Smith-Lever Act of 1914 – Established a Federal-State cooperative extension program to provide

education for the public in agricultural and natural resources.

Clarke-McNary Act of 1924 – Authorized technical and financial assistance to the states for forest fire control and for production and distribution of forest tree seedlings. (Sections 1 through 4 were repealed by the Cooperative Forestry Assistance Act of 1978).

McSweeney-McNary Act of 1928 – Authorized a comprehensive Forest Service research program. (This act was repealed and supplanted by the Forest and Rangeland Renewable Resources Research Act of 1978.)

Multiple-Use-Sustained Yield Act of 1960 – Established a policy of multiple uses, sustained yield management for the renewable resources of the National Forest System.

McIntyre-Stennis Act of 1962 – Established a cooperative forestry research program for state land grant colleges and universities.

Clean Air Act of 1963 – Gave the federal government enforcement powers regarding air pollution for the first time. This act and subsequent amendments impact the forest industry by affecting prescribed burning for forest management and emissions from forest products manufacturing plants.

Wilderness Act of 1964 – Established the National Wilderness Preservation System by setting aside sections of federal forest land as wilderness.

National Environmental Policy Act of 1969 – Required that environmental considerations be incorporated into all federal policies and activities, and that all federal agencies prepare environmental impact statements for any actions significantly affecting the environment.

Federal Water Pollution Control Act Amendments of 1972 – Established as a national objective restoring and maintaining the chemical, physical, and biological integrity of the nation's water, and required area wide planning to prevent future

water pollution that could be associated with growth, development, and land use, including timber management.

Endangered Species Act of 1973 – Provided for the protection and conservation of threatened and endangered fish, wildlife, and plant species. Directs all federal agencies to utilize their authorities and programs to further the purpose of the Act.

National Forest Management Act of 1976 – Established additional standards and guidelines for managing the national forests, including directives for national forest land management planning and public participation.

Cooperative Forestry Assistance Act of 1978 – Authorized the Secretary of Agriculture to work in cooperation with state foresters in nine cooperative forestry assistance programs. Among these programs is the Forestry Incentives Program, a federal cost-share program designed to encourage the management of private forest lands.

Renewable Resources Extension Act of 1978 – Authorized expanding the forest and rangeland renewable resources portion of the extension education program.

Forest and Rangeland Resources Extension Act of 1978 – Authorized expanding forest and rangeland renewable resources research.

Reforestation Tax Incentives (part of the Recreational Boating Safety and Facilities Improvement Act of 1980) – Provided tax credits and deductions for landowners who reforest their property as an incentive to encourage reforestation.

Food Security Act of 1985 (1985 Farm Bill) – Established the Conservation Reserve Program. The program was designed to conserve 40 to 45 million acres of highly erodible cropland by paying landowners to plant permanent vegetative cover, such as grass or trees, and maintain that vegetative cover for 10 years.

Food, Agriculture, Conservation, and Trade Act of 1990 (1990 Farm Bill) – Established the Forest Stewardship Program, a program designed to encourage multiple resource forest management on nonindustrial private forest lands. A companion program, the Stewardship Incentives Program, was designed to provide cost-share assistance funding to encourage the implementation of management practices.

Coastal Zone Act Reauthorization Amendments of 1990 – Required that states with Coastal Zone Management Programs develop and implement Coastal Nonpoint Pollution Control Programs to control sources of nonpoint pollution (including managed forests), which impact coastal water quality.



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