

## **Professional Foresters Registration Examination October 07<sup>th</sup>, 2016**

### **PART I**

**Instructions: APPLICANTS, PLEASE READ THESE INSTRUCTIONS CAREFULLY. You MAY complete PART I by doing ONE of the following two options:**

**A) Complete the Short Answer Section (Question 1) and any TWO (2) of the Essay Questions (Questions II through V)**

(If Option A for Part I is chosen, write directly on the booklet, tear, and submit with answer packet)

### **OR**

**B) Complete any THREE of the Essay Questions (Questions II through V) and OMIT answering the Short Answer Question (Question I).**

**Question II - Forest Mensuration**

**Question III - Forest Ecology**

**Question IV - Silviculture**

**Question V - Forest Protection**

Professional Foresters Registration  
1416 9th Street, Room 1506-16  
Sacramento, CA 95814

**ACRONYMS AND ABBREVIATIONS USED IN THIS EXAMINATION**

The following Acronyms and/or Abbreviations **may be used** in this examination.

Technical abbreviations that should be known by a forester are NOT included here (e.g. DBH, MAI, MBF). You may remove this page for reference throughout this examination. **It need not be returned.**

<u>Acronym or Abbreviation</u>	<u>Full Text</u>
BLM	Bureau of Land Management, USDI
BOF	California State Board of Forestry and Fire Protection
CCR	California Code of Regulations
CAL FIRE	California Dept. of Forestry and Fire Protection
CDF&W	California Department of Fish and Wildlife
FPR	California Forest Practice Rules
PRC	California Public Resources Code
RPF	California Registered Professional Forester
THP	California Timber Harvest Plan
TPZ	California Timber Production Zone
USFS	United States Forest Service, USDA

**Answer on these pages, tear from the booklet, and submit with the answer packet if you chose Option A for Part I of this examination.**

**QUESTION I SHORT ANSWER**

3% 1. As used in Silviculture, what is **stand structure**?

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3% 2. As defined in the FPRs, what does **supervision** mean when an RPF has a supervised designee?

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3% 3. As used in silviculture and mensuration, what is a **stock table**?

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3% 4. As used in Forest Management, what is **sustained yield**?

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3% 5. Define **adaptive forest management**.

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4% 6. As used in Forest Fire Management list four (4) common **prescribed fire ignition patterns**.

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3% 7. As used in Forest Ecology and the FPRs regeneration methods, what is a **phenotype**?

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3% 8. List **three specific, quantifiable, field observable, individual tree physical characteristics** that a tree marker can use to decide which of two equal sized trees of the same species to retain in a thinning.

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3% 9. As used in the FPRs, what does **hydrologic disconnection** mean?

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2% 10. According to the Endangered Species Act (1976) what criteria qualify a species to be listed as an **endangered species** and published in the Federal register?

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3% 11. Briefly summarize three (3) of the **central policies** of the 2010 California **Fire Plan**.

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3% 12. List the three (3) of the key elements of **defensible space** for **structures** in the BOF General Guidelines for Creating Defensible Space.

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3% 13. As used in Forest Engineering, what is **forwarding**?

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3% 14. As used in Forest Economics, what is a **supply curve**?

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3% 15. Used as an economic basis of the California Fire Plan, what is **Economic Fire Protection Theory**?

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4% 16. The **abiotic** parts of an ecosystem can generally be defined as:

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3% 17. As used in Forest Ecology (genetics) and the FPRs Resource Conservation Standards, what is **progeny testing**?

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3% 18. Define **ad valorem tax** and give an example of a forest asset taxed in this manner in California.

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3% 19. On a cable logging system, explain the purpose of the **haul back line**.

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3% 20. A THP map has a scale of 1 inch= 200 ft. and has 25 ft. contour intervals. A proposed temporary road for a logging unit extends 4.5 inches from one permanent road to the intersection with another permanent road. The proposed temporary road starts on a contour line, crosses four other contour lines and ends, at the landing, on a fifth contour line. What is the grade of this proposed temporary road (round to the nearest percent)? Please show your work.

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3% 21. The extent to which the lower portion of a tree's stem diverges from straight, usually measured in degrees, is termed:

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3% 22. The Scribner Dec. C log rule differs from the International 1/4" Rule in what basic way?

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4% 23. List **four (4)** types of defects that will result in diameter, volume or length deductions by a scaler.

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4% 24 The maintenance of destructive agents (such as insects) at tolerable levels, by the planned use of a variety of preventive, suppressive, or regulatory tactics and strategies that are ecologically and environmentally efficient and socially acceptable is termed:

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3% 25. Fire behavior is greatly affected by relative humidity. Define relative humidity.

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4% 26. List **four (4)** purposes a THP document serves during its life:

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3% 27. Dunning's Classification is used to classify **tree condition** of which species of conifers in the FPRs?

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3% 28. According to the Forest Practice Rules, the planned program of forest stand treatments during the life of a stand which consists of a number of integrated steps conducted in logical sequence leading to or maintaining a forest stand of distinctive form for the level of management intensity desired is called a:

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3% 29. A written analysis of pre-harvest and post-harvest timber stand conditions and a description of the silvicultural practices and systems to be used in lieu of the standard methods in a Timber Harvest Plan (THP) are termed a(an)

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3% 30. According to the CA. Forest Practice Regulations, under what conditions is an on-site meeting between the responsible RPF preparing a THP (or supervised designee) and the LTO (or supervised designee) required? Also, specify the time interval when this meeting must occur.

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3% 31. In a THP, what does the term "Appurtenant" roads mean?

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3% 32. If a Public Land Survey section has all normal measurements, how many acres are in the NE1/4 NE1/4 SW1/4 SE1/4?

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**END OF QUESTION I**

## QUESTION II - FOREST MENSURATION

**OBJECTIVE:** To evaluate your mensuration knowledge and ability to estimate the standing volume and annual growth of timber stands.

**SITUATION:** You are a consulting forester working for a family forest owner with 36 acres of pure, young growth Ponderosa pine that was planted after a stand replacing wildfire, 70 years ago. The owner states that her grandfather and father have both managed the property before her. She knows that there have been firewood and both non-commercial and commercial thinning cuts done in the past at irregular intervals to remove poorly formed trees, improve spacing, and to improve growth on future crop trees.

The owner would like to have you prepare a **preliminary forest stand description** of what she has on her small forest. For the present, she is only willing to pay you for no more than three days work, but in the future she may decide to have a long-term forest management plan drafted. You inform her that for the time and money she is presently willing to spend, you can only do a cruise sufficient to produce a stand and stock table for gross volumes and some limited growth information and prediction, but you will **not be able to address** net volumes, log grades, or monetary values.

Your preliminary walk-through evaluation of the 36 acres reveals that the entire property is quite homogeneous with the similar site class and stand characteristics (density, diameter distribution, etc). Therefore, you do not see a need to stratify the ownership. The 36 acres looks to be pure Ponderosa pine and well to slightly over-stocked. You decide on the following cruise methods to match the owner's objectives and the time and money available for this work:

### Methods Used:

1. Fixed radius plot cruise- 10 plots systematically located across the farm forest, 1/20 ac. plots;
2. Volume determination by Ponderosa pine Tariff Access Table (condensed from VARPLOT Scribner Tables, 32 ft logs to a 5inch top);
3. Growth data from 10 sample trees which will also be the Tariff tree on each plot; last 5 years of radial growth collected.

### Resources and Data Provided:

1. The plot data collected are shown on the Sample Tree Tally Card on page 12. Note that this Sample Tree Tally Card is Incomplete as given.
2. A blank Volume Computation Form on page 13.
3. Tariff Access Table for Ponderosa pine on page 14.
4. A Tree Volume Table (Scribner volume table, 32 ft. logs to a 5-inch top) on page 15.

**IMPORTANT: READ THIS BEFORE BEGINNING WORK:** For all questions, **the answer must be written in the box provided with the question.** The computational worksheets are provided to help you organize your data and computations. However, while you may remove the various worksheets and tables from the examination, to help in your progress with this question, **you must turn in the various worksheets and tables with your examination. Put your application number in the space provided on each Resources and Data page provided for this question. Failure to do so will result in failing the ENTIRE question.**

**QUESTIONS: FOREST MENSURATION**

5% 1. Based on the plot-sampling scheme, what is the sampling intensity of this cruise?

Cruise Sampling intensity (nearest 0.1%) =	
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15% 2. For the diameter classes present in the sample, determine the Total Trees Per Acre (TPA) by diameter class and for the average stand acre. Enter the TPA answers in the appropriate spaces below.

Diameter (inches)	Trees Talled All Plots	Total Trees Per Acre
9	2	
10	6	
11	4	
12	9	
13	11	
14	10	
15	7	
16	8	
17	6	
18	7	
19	2	
20	3	
Total	75	

5% 3. Determine the average radial growth for the stand for the last 5 years. Enter the average stand radial growth in the answer space below.

Average Radial Growth (nearest 0.01 inches) =	
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**FOREST MENSURATION TURN THIS PAGE IN WITH EXAM**

**Tree Tally Card**

User name \_\_\_\_\_ Plot size \_\_\_\_\_ Multiplication factor\* \_\_\_\_\_  
 Stand name PETER'S PINES Species PP Average tariff number \_\_\_\_\_  
 Date RPF TEST DAY Stand age ~70 yrs

DBH (in.)	Plot number										Total trees	Total trees per acre
	1	2	3	4	5	6	7	8	9	10		
7												
8												
9	•				•						2	
10	•	•	•	•	•	•	•	•	•	•	6	
11	•	•	•	•	•	•	•	•	•	•	4	
12	•	••	•	•	•	•	•	•	•	•	9	
13	•	•	•	••	•	••	•	•	••	•	11	
14	••	•	•	•	••	•	•	•	•	•	10	
15	•	•	•	•	•	••	••	•	•	•	7	
16	•	•	••	•	•	•	•	•	•	••	8	
17	•	•	•	•	•	•	•	•	••	•	6	
18	•	•	•	•	••	•	•	•	•	•	7	
19	•	•	•	•	•	•	•	•	•	•	2	
20					•	•	•	•	•	•	3	
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
34												
35												
36												
Total												

Tariff Trees				
1	2	3	4	5
Plot no.	DBH (in.)	Height to nearest 5 ft.	Radial growth for 5 yrs. (in.)	Tariff no. from access tables
1	18	95	0.6	
2	12	70	0.5	
3	14	75	0.4	
4	19	100	0.6	
5	17	90	0.5	
6	13	70	0.6	
7	15	85	0.5	
8	15	80	0.6	
9	20	110	0.7	
10	10	50	0.5	
Total				
Average				

\* Multiplication factor =  $\frac{\text{Plot size correction factor}}{\text{Number of plots}}$

- Dot count key
- = 1
  - = 2
  - = 3
  - = 4
  - |• = 5
  - ┌• = 6
  - = 7
  - = 8
  - ☑ = 9
  - ☒ = 10

**Remember**  
 The first tree from each plot is recorded as a Plot Tree **and** as a Tariff Tree.

Recommended plot sizes	Distance between trees			
	less than 8 ft.	8-16 ft.	16-24 ft.	more than 24 ft.
Plot size (acres)	1/100th	1/50th	1/20th	1/10th
Plot radius (ft. & in.)	11'10"	16'8"	26'4"	37'2"
Plot radius (ft.)	11.8	16.7	26.3	37.2
Plot size correction factor	100	50	20	10

**Volume Computation Form**

Stand name \_\_\_\_\_ Date \_\_\_\_\_  
 Species \_\_\_\_\_ Average radial growth \_\_\_\_\_  
 Stand age \_\_\_\_\_ Average basal area/tree \_\_\_\_\_  
 Average tariff number \_\_\_\_\_ Average stand diameter \_\_\_\_\_  
 Multiplication factor \_\_\_\_\_ Board-foot volumes (16' or 32') \_\_\_\_\_

	1	2	3	4	5	6	7
DBH	Trees/ acre	Board ft. vol./tree (from Tree Volume Tables)	Board ft. vol./acre (col. 1 x col. 2)			Basal area/tree	Basal area/acre by diameter class (col. 1 x col. 6)
7						0.267	
8						0.349	
9						0.442	
10						0.545	
11						0.66	
12						0.785	
13						0.922	
14						1.069	
15						1.227	
16						1.396	
17						1.576	
18						1.767	
19						1.969	
20						2.182	
21						2.405	
22						2.64	
23						2.885	
24						3.142	
25						3.409	
26						3.687	
27						3.976	
28						4.276	
29						4.587	
30						4.909	
31						5.241	
32						5.585	
33						5.939	
34						6.305	
35						6.681	
36						7.068	
	Total trees/acre	Total board-foot volume/acre	Total cubic-foot volume/acre			Total basal area/acre	

**FOREST MENSURATION TURN THIS PAGE IN WITH EXAM**

Appendix A3.—Tarif access table for **ponderosa pine**. Condensed from VARPLOT Tree Volume Tarif Access Tables (2002).

		Height (feet)																													
		30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165		
7				16	18	20	22	24	27	29	31	32	36	38	40	43	45														
8				15	16	19	21	23	25	27	28	31	34	36	38	40	42	45													
9				15	16	18	20	22	24	26	28	30	32	34	37	38	40	43	45												
10					15	17	19	20	23	25	27	29	31	33	35	37	39	41	43	45											
11					15	17	18	20	22	24	26	28	30	32	34	36	38	40	42	44	45										
12					15	16	18	20	22	23	25	27	29	31	33	35	37	38	40	42	44										
13					15	16	18	19	21	23	25	27	28	30	32	34	36	37	39	41	43	45									
14						15	18	19	21	22	24	26	28	30	31	33	35	37	39	40	42	44									
15						15	17	18	20	22	24	25	27	29	31	33	34	36	38	40	41	43	45								
16						15	16	18	20	21	23	25	27	28	30	32	34	35	37	39	41	42	44								
17						15	16	18	19	21	23	25	26	28	30	31	33	35	36	38	40	42	44	45							
18						15	16	18	19	21	23	24	26	28	30	31	33	34	36	38	39	41	43	45							
19						15	16	17	19	21	22	24	25	27	29	30	32	34	36	37	39	41	42	44							
20						15	16	17	19	20	22	24	25	27	28	30	32	33	35	37	38	40	42	44	45						
21							15	17	19	20	22	23	25	27	28	30	31	33	35	36	38	40	41	43	45						
22							15	17	18	20	21	23	25	26	28	29	31	33	34	36	38	39	41	43	44						
23							15	17	18	20	21	23	24	26	28	29	31	32	34	36	37	39	41	42	44						
24							15	17	18	20	21	23	24	26	28	29	31	32	34	35	37	39	40	42	43	45					
25							15	16	18	19	21	22	24	26	27	29	30	32	33	35	37	38	40	41	43	45					
26							15	16	18	19	21	22	24	25	27	28	30	32	33	35	36	38	40	41	43	44					
27							15	16	18	19	21	22	24	25	27	28	30	31	33	35	36	38	39	41	42	44					
28							15	16	17	19	20	22	23	25	27	28	30	31	33	34	36	37	39	41	42	44	45				
29							15	16	17	19	20	22	23	25	26	28	29	31	33	34	36	37	39	40	42	43	45				
30							15	16	17	19	20	22	23	25	26	28	29	31	33	34	35	37	38	40	42	43	45				
31							15	16	17	19	20	22	23	25	26	28	29	31	32	34	35	37	38	40	41	43	44				
32							15	16	17	19	20	21	23	24	26	27	29	30	32	33	35	36	38	40	41	43	44				
33							15	16	17	18	20	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42	44	45			
34								15	17	18	20	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42	44	45			
35								15	17	18	20	21	23	24	25	27	28	30	31	33	34	36	37	39	41	42	43	45			
36								15	17	18	20	21	22	24	25	27	28	30	31	33	34	36	37	39	41	42	43	45			

DBH (inches)

FOREST MEASUREMENT 17



15% 4. Determine the Average Board Foot Volume per Acre for this stand (Scribner, 32 ft logs, 5 inch top). Write the answer in the space provided below.

Average Board Foot Volume per Acre =	
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10% 5. What is the Total Basal Area Per Acre for this stand, based on the sampling data? Write the answer in the space provided below.

Total Basal Area Per Acre (ft <sup>2</sup> ) =	
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5% 6. What is the Average Basal Area Per Tree? Write the answer in the space provided below (nearest 0.1 ft<sup>2</sup>).

Average Basal Area Per Tree (ft <sup>2</sup> ) =	
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15% 7. What is the Quadratic Mean Diameter (QMD) of this stand? Write the answer in the space provided below.

Quadratic Mean Diameter (nearest 0.1 inches) =	
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Formula for QMD=  $\sqrt{\frac{\sum D_i^2}{n}}$  D =tree diameter, i = for each tree, n = number of trees

10% 8. Why is the QMD often favored in Mensuration descriptions of a stand rather than the arithmetic average diameter?

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**FOREST MENSURATION TURN THIS PAGE IN WITH EXAM**

15% 9. Determine the Board Ft. Volume/acre (32 foot logs, 5-inch top diameter, Scribner Log Rule) by diameter class and for a typical acre. Write the answers in the appropriate spaces provided below.

Diameter (inches)	Board Feet Volume/Acre
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
Total	

5% 10. Assume that instead of the uniform stand that is in this problem, this property has a predominately younger stand with several significantly older and larger Ponderosa pine trees per acre scattered throughout. Briefly discuss how you would adjust your sampling and volume estimation methods, using the same basic tariff table methodology?

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**FOREST MENSURATION TURN THIS PAGE IN WITH EXAM**

**END OF QUESTION II**

## QUESTION III-FOREST ECOLOGY

### OBJECTIVE

To demonstrate your understanding of the advantages and disadvantages of mixed species stands

### SITUATION

Throughout the history of American Forestry, assertions have been made that mixed species stands of trees are somehow “better” than stands dominated by a single tree species.

### QUESTIONS

10% 1. Discuss where a forester is most likely to find a naturally occurring mixed species stand of trees and to find a stand of naturally occurring trees dominated by a single tree species in the U.S.? Explain an ecologic reason for the two stand type’s development in the locations you describe.

15% 2. Mixed stands are often thought to be “more stable” than stands dominated by a single tree species. What do you think is meant by more stable and do you think this is true or false? Explain your reasoning.

15% 3. Discuss relative advantages for nutrient cycling, productivity, and site utilization in a multiple conifer species with hardwoods stand compared to a stand dominated by a single conifer tree species. Use examples to aid your discussion.

15% 4. Discuss the effect of insect or disease epidemics on multiple conifer species with hardwoods stand compared to a stand dominated by a single conifer tree species. Do not limit your discussion to total stand replacement effects.

15% 5. Discuss economic advantages and disadvantages of a multiple conifer species with hardwoods stand compared to a stand dominated by a single conifer tree species? Use examples to aid your discussion.

15% 6. In terms of multiple-uses, which type of stand would be more advantageous: a multiple conifer species with hardwoods stand compared to a stand dominated by a single conifer tree species? Give at least three examples and explain your reasoning.

15% 7. Discuss three (3) operational advantages and three (3) operational disadvantages of managing a mixed species stand of trees. Use examples to aid your discussion.

**END OF QUESTION III**

## QUESTION IV FOREST SILVICULTURE

### OBJECTIVE

This question is designed to allow you to demonstrate your ability to describe and understand forest stand conditions, then select and justify a site specific silvicultural system that will meet the intent of the California Forest Practice Act.

### SITUATION

Given the objective described above, be specific in stating your assumptions and answers. The answers should demonstrate technical competence and be clear enough to be understood by agency professionals and the public. This is exactly what is required of an RPF when submitting a THP.

### QUESTION

10 % 1. Define the term "**stand structure**".

20 % 2. Describe the "structure" of **FOUR (4)** of the following general stand types. (Graphs or diagrams are acceptable.)

- Even-aged
- Uneven-aged
- Storied
- Irregular
- Even-aged Group
- Reserve

20 % 3 a. For each of the **four (4)** stand structures you described above, list **all of the regeneration method(s) and intermediate treatments** as found in the California Forest Practice Rules which are usually most appropriate for maintaining or achieving maximum sustained production of wood. (Note: When more than one regeneration method or intermediate treatment is appropriate for a particular stand structure list them all.) **DO NOT USE ALTERNATIVE PRESCRIPTION**)

30 % 3 b. Also, **for each stand structure** you described use one of your listed **regeneration methods** to briefly describe and explain how the regeneration method relates to achieving or maintaining that structure.

10 % 4. Define the term "**stand composition**" and how it is **quantitatively** expressed.

10 % 5. What do the California Forest Practice Rules require or suggest about **stand composition** after harvest in order to meet post-harvest stocking standards?

**End OF Question IV**

## QUESTION V- FOREST PROTECTION

### OBJECTIVE

To demonstrate your understanding of the interaction between damaging insects and ecological succession in a drought affected forest situation.

### SITUATION

Scattered mortality of Douglas-fir is occurring in Plumas County, at elevation 2500 feet. Ponderosa pine, Douglas-fir and some black oak overtop an understory of Douglas-fir, incense-cedar, madrone and black oak. The dead Douglas-fir occur singly or in groups of two to six trees in the size classes of sawtimber and large poles. Few saplings are involved. The greatest area of present accelerated mortality occurs where overstocking previously existed (greater than 250 sq. ft. of basal area per acre).

The number of stumps at sites of previous mortality also indicate that overstocking existed when the initial mortality began with the drought of 1987-1991. Additional mortality occurred during the 2001 to 2005 drought. Mortality continued occurring during the 2012 to 2016 drought. However, growth of the remaining dominant Douglas-firs (now about 110 years old) has been relatively good. Site quality is rated as a high III, Dunning.

Many of the dead trees are found to be infested with the flatheaded fir borer, Melanophila drummondi (Kirby), and woodpeckers have actively fed on the broods for at least two years. Vertical strips of cambium were killed on some trees.

The drainage was periodically entered for salvage after 1988. The first entry salvaged drought stressed ponderosa pine (killed by the western pine beetle and California flatheaded borer) as well as Douglas-fir, but recent mortality and salvage has been limited to Douglas-fir. As a result, some sites are becoming understocked. This has led to increased brush growth and a significant, competing brush component occurs in natural and man-made openings. There probably has been a warming of these sites, but sunscald did not appear to be the mortality problem. No diseases were found to be affecting the trees.

### QUESTIONS

50% 1. Discuss how the **interaction of insects, drought, salvage and ecological succession** at this site have resulted in the present stand condition.

50% 2. Discuss your **recommended future management alternatives** based on your answers to #1 and the past management practices on the property. (Include a discussion of the effect of no action.)

**END OF QUESTION V**

**Professional Foresters Registration Examination  
October 07<sup>th</sup>, 2016**

**Part II**

**Applicant Must Also Answer Three of the Remaining Five  
Essay Questions in Part II**

Question VI-Forest Engineering  
Question VII-Economics  
Question VIII-Forest Administration  
Question IX-Forest Policy  
Question X-Forest Management

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## QUESTION VI-FOREST ENGINEERING

### OBJECTIVE

To demonstrate your understanding of the relationship between management goals, forest road standards and location, and environmental effects.

### SITUATION

A primary requisite to forest operations is a transportation system. In most cases, access to forestland is accomplished by the location and construction of truck roads. Management goals will dictate the standards of the roads to be constructed and thus affect the methods of location and construction employed.

### QUESTIONS

20% 1. When describing road standards, explain what is meant by PHYSICAL standards and SERVICE standards. Include **3 examples for each** type of standard.

30% 2. Discuss how differing management goals may affect the selection of road standards if the forest landowner is:

- a) a public agency,
- b) a small private land owner,
- c) a large industrial owner.

Give examples in your answer.

20% 3. **Define** the following elements of forest road route selection. Briefly **discuss** how these elements relate to one another in practice.

- a) Reconnaissance
- b) Control points
- c) Grade-lines

30% 4. Poor choices of road standards **and** route selection can result in significant negative environmental impacts. Identify **three (3)** road standards and **two (2)** route selection considerations that may result in significant negative environmental impacts. Identify **two** possible impacts **for each** route standard and route selection you have chosen to discuss and **for each impact, briefly discusses a mitigation**, which might address each possible impact you list. Consider using a matrix for your answer.

END OF QUESTION VI

## QUESTION VII-FOREST ECONOMICS

### OBJECTIVE

To demonstrate your understanding of the interacting economic factors involved in the multiple-use approach to forest management.

### SITUATION

Most public forest properties and many private forest properties are managed on what is variously termed a multiple use, multiple products or multiple services approach. One method of evaluating the economics of multiple use is to use a present net worth criterion.

### QUESTIONS

- 15% 1. Briefly, describe what is meant by a multiple use approach to management.
- 15% 2. Briefly, describe the patterns of land use allocations which emerge under the multiple use approach **and** possible reasons for such patterns.
- 20% 3. Utilizing economic price theory, briefly discuss how the criteria of present net worth can be used by the manager to **determine if an optimum balance of uses is being achieved** at a given level of management expenditures.
- 10% 4. If this present net worth criteria were used, **what economic relationship would exist between the various multiple use options at the optimum level?** (Use economic theory to describe the conditions).
- 40% 5. Briefly discuss **four practical problems** of using the present net worth criteria for management decisions in real life situations.

END OF QUESTION VII

## QUESTION VIII- FOREST ADMINISTRATION

### OBJECTIVE

To determine your understanding of the appropriate application of information to managing a forest property.

### SITUATION

Assume you are employed by a forest consultant attempting to quantify the multi-resource impacts of a variety of proposed forest and rangeland management practices on a watershed basis for a large forest landowner. Your organization possesses a geographic information system technology (GIS) and has already incorporated two data layers (e.g. resource information): watershed boundaries and stream locations.

### QUESTIONS

- 50% 1. Both of the following wildland elements may potentially receive impacts from proposed on-site management practices. For **EACH** element, **list three (3)** data layers (other than watershed boundaries and stream locations) that you would give **priority for inclusion** into the GIS and **briefly discuss how they would be used to evaluate** proposed plans.
- 25% a. Threatened and Endangered Species  
25% b. Water Quality
- 30% 2. The forest landowner requests that you assess the requirements for wildfire suppression on the watershed. List **four (4)** data layers you would recommend for inclusion in the GIS and **briefly discuss** how they would be used for **allocation of resources for fire suppression and protection of public value.**
- 20% 3. **Identify and briefly discuss three (3) of the advantages and three (3) of the disadvantages** of a GIS over the use of conventional paper maps for most resource management applications.

END OF QUESTION VIII

## QUESTION IX- FOREST POLICY

### OBJECTIVE

To demonstrate your understanding of the requirements and responsibilities of a professional forester, and of enforcement alternatives when violations of the Forest Practice Act occur.

### QUESTIONS

15% 1. What **three (3)** qualifications must an APPLICANT meet to qualify for licensing as a registered professional forester in California?

10% 2. Under Article 3, Section 750 of the Public Resources Code of the State of California known as the **Professional Foresters Law**, what **two types** of acts are declared unlawful for any person who is **not** a registered professional forester?

10% 3. Name **two (2)** other laws of California (other than the **Professional Foresters Law**) which specify particular functions to be performed by registered professional foresters **and identify** the nature of the function under each of these two laws.

5% 4. What organization of state government is charged with directing the licensing of professional foresters?

5. What are the penalties of violating the **Professional Foresters Law**?

5% a. for unlicensed persons, **and**;

5% b. for registered professional foresters?

Under the Z'berg-Nejedly Forest Practice Act of 1973, any person who willfully violates any provision of the Act or Rules or Regulations of the Board of Forestry may be subject to one of several types of penalties or enforcement actions.

50% 6. Briefly discuss **five (5)** of the following items as they relate to forest practices under the Forest Practice Act:

**10% each.**

- a. Disciplinary Action
- b. Misdemeanor
- c. Administrative Stop Order
- d. Temporary Restraining Order or Action to Enjoin
- e. Injunction
- d. Corrective Action

**END OF QUESTION IX**

## QUESTION X- FOREST MANAGEMENT

### OBJECTIVE:

To determine your understanding of the relationship between generally accepted forest management practices and the maintenance of forest structure and composition at various scales for wildlife diversity.

### QUESTIONS:

- 30% 1.a. Discuss why the **size and spatial arrangement** of late succession stage forests (and stands) is believed to be critical for maintenance of species dependent upon that habitat.
- 10% 1.b. Discuss how **landscape design techniques** or harvest unit layouts can provide mitigation for wildlife inhabiting late succession stage forests.
- 40% 2. Discuss **four (4)** elements of structure **and** composition of late succession stage coniferous forests. Include the **benefits to wildlife** and how these elements might be favored when designing harvest units.
- 20% 3. Briefly describe the **positive and negative effect** of an increase in ecotonal acreage across a forested landscape on plant and animal species richness.

END OF QUESTION X

# END OF EXAM