

# Professional Foresters Registration Examination April, 2015

## 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)**

**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 - Forest Economics

Question V - Forest Protection

Professional Foresters Registration  
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### 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
DFW	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 ANSWERS**

3% 1. When an alien or exotic species can establish, grow, reproduce, and maintain itself in an area where it did not originally grow, it is said to be:

\_\_\_\_\_

4% 2. You wish to thin a stand of trees to an average 20 ft. x 20 ft. square spacing. How many trees per acre would your thinned stand have on the average acre?

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2% 3. California is rich in natural resources. Of the 85 million acres classified as wildlands, about how many are commercial forest land?

\_\_\_\_\_

3% 4. Name **three** important social issues that are impediments to increased use of prescribed burning

\_\_\_\_\_

3% 5. According to the Forest Practice Rules definition, which of these three major slope forms is most stable: Planar, Divergent or Convergent?

\_\_\_\_\_

3% 6. What California **law** requires forest practice regulations to address archeological resources?

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examination.**

**QUESTION I - SHORT ANSWERS**

3% 7. Consider two California Commercial Conifer stands, both similar in most respects (site, topography, species, successful planting origin, fire and pest effects, etc.), and approaching typical rotation age. One stand was thinned from below 35 Years ago (biomass) and 15 years ago (commercial thin). The other stand had no intermediate treatments. Which stand will have the **greater standing cubic volume** of wood?

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3% 8. As applied to the growth of an even-aged stand of trees, which parameter **peaks first**, the volumetric MAI or the volumetric PAI?

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3% 9. Define the economic term "**Externality**".

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3% 10. What is the "**coefficient of variation**" used to measure?

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2% 11. According to the definitions in the FPR (CCR 895.1), what stream order is required for a planning watershed **and** generally what is the maximum acreage for a planning watershed?

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examination.**

**QUESTION I - SHORT ANSWERS**

3% 12. The process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership is known as:

\_\_\_\_\_

3% 13. In mechanized felling, what is the **function of an “accumulator”**?

\_\_\_\_\_

\_\_\_\_\_

3% 14. As discussed and diagramed in Technical Addendum # 5, define a **Critical Dip**.

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\_\_\_\_\_

3% 15. Utilization of forest biomass for bioenergy can benefit the state in several ways. **List three major** benefits.

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\_\_\_\_\_

3% 16. Under the Forest Practice Act regulations governing "nonindustrial timberland", **list three characteristics** which define a “nonindustrial” tree farmer.

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\_\_\_\_\_

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examination.**

**QUESTION I - SHORT ANSWERS**

3% 17. An **Ecosystem** can generally be defined as:

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3% 18. You have been doing THP fieldwork following a strong windstorm. You find a large bird nest on the ground near a clump of recently downed tall snags. The nest is comprised of large to small sticks and contains a variety of odd items (tin cans bottles, rope, shells) and three oval broken pinkish-white eggs about 2 inches long. What have you likely found?

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3% 19. Define the **Allowable Cut Effect**.

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3% 20. For northern California, **list three salmonids** that have been placed on the Federally Threatened or Endangered list. Give **either** the common **or** scientific names. (Northern California is commonly defined as that geographic region north of the Tehachapi Mountains.)

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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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examination.**

**QUESTION I - SHORT ANSWERS**

3% 22. Define **Avulsion** as used in fluvial geomorphology.

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3% 23. What other law was brought to bear on the Forest Practice Act by the court ruling in Natural Resources Defense Council, Inc. v. Arcata National Corp. (or "Broaddus Decision") [Answer must be written out in its entirety, no abbreviations]?

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3% 24. Define **BI or Burning Index** as it is used in Fire management.

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3% 25. *Armillaria mellea* (oak root rot) is endemic in California. What are **two ways** by which you can **decrease the prevalence** of this problem in a managed forest setting?

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3% 26. What are the **three primary stand management factors** controlling regeneration when utilizing Group Selection Silviculture?

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**Answer on these pages, tear from the booklet and submit with  
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examination.**

**QUESTION I - SHORT ANSWERS**

3% 27. Define a **bone-dry unit**. \_\_\_\_\_

\_\_\_\_\_

4% 28. What is "**Discounted cash flow**"? \_\_\_\_\_

\_\_\_\_\_

3% 29. As defined in the 2015 CA FPRs, what is a **Deactivated Road**?

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\_\_\_\_\_

3% 30. Define **Carbon Sequestration**. \_\_\_\_\_

\_\_\_\_\_

2% 31. There are multiple permit options available for fuel hazard reduction on private and state-owned lands. Under the "**La Malfa**" **Forest Fire Prevention Exemption** (CCR 1038(i)), what is the **acreage limit** that may be treated?

\_\_\_\_\_.

3% 32. A deduction from taxable income, allowed under specific conditions, by U.S. tax laws to the owners of timber for reduction of an original growing stock through cutting is called: \_\_\_\_\_

4% 33. State **two silvicultural reasons** that reforestation surveys are done.

\_\_\_\_\_

\_\_\_\_\_

**END OF QUESTION I**

## QUESTION II - FOREST MENSURATION

### OBJECTIVE:

To demonstrate your ability to describe fundamental mensuration principles and explain their relative importance.

### SITUATION:

Consider yourself to be an inventory forester for the Small Time Timber Co. The firm's president recently hired a young accountant. The accountant has asked you to answer certain questions about a recent point sampling cruise that you conducted in a mature stand of Douglas- fir. After talking with this young man for a few minutes, you realize that his questions are somewhat naive and that he knows very little about forestry, timber cruising, or statistics. Therefore, you decide that your answers must be very thorough and specific. Please answer each of the following questions for the accountant.

### QUESTION:

- 10%      1. "You determined the acreage of the cruised stand of Douglas-fir with the use of a GPS unit and computer software. **Briefly** describe: **What** GPS is and **how** it works, including **what** type of data is obtained and stored to determine the stand's acreage and **how** you used the GPS unit in the field.  
Include in your answer a brief **explanation of how** the data obtained by the GPS can be used to determine the acreage of a traversed area."
- 10%      2. "You say that you sampled 30 points and used a BAF (basal area factor) of 50.  
What do you mean by **points**?  
What is a **BAF**?  
Why did you **not calculate** a percent intensity for this cruise?"

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**QUESTION II – continued FOREST MENSURATION**

- 15% 3. "You say that the average stand basal area was 250 square feet per acre. What does this mean?  
How did you calculate it?  
On the average, how many trees per point would it take to get 250 square feet per acre?  
Is 250 square feet per acre average stocking for these types of stand?"  
**Explain** your answer.
- 15% 4. "You say that the average tree in your stand has a net V-BAR (Volume- basal area ratio) of 33.0 (based on cubic feet to a 4-inch top).  
**What** is the net volume per acre and **how** do you calculate it?  
Does the V-BAR **change** with the age of the stand?  
If so, **why**?"
- 10% 5. "If you sampled a tree that had a DBH of 24 inches, how much basal area does this represent?  
How many trees per acre would a sampled 24 inch DBH tree represent?"
- 20% 6. "You say that each tree measured during the cruise represents the same amount of basal area per acre no matter how big the tree. That doesn't make sense to me. Can you **explain** why this is so?"
- 20% 7. "You say that your net volume standard error was 12 percent. What kind of error is this?  
Why did it occur?  
What does it mean about the reliability of your work?  
How can it be avoided in the future?"

**END OF QUESTION**

### QUESTION III - FOREST ECOLOGY

**OBJECTIVE:**

To demonstrate your understanding of the linkage of forest practices and water quality.

**SITUATION:**

Concern has been expressed in the Tahoe Basin that commercial forestry and other forestland management operations could contribute to cultural eutrophication of Lake Tahoe. Similar concerns exist in California and other states for both fresh and ocean waters.

**QUESTIONS:**

50% 1. **Define, explain and compare** the journey of relatively pristine waters towards eutrophication or cultural eutrophication in terms of processes **and** ecological consequences.

20% 2. **Identify and briefly discuss three** significant types of **forest** land-use that might contribute to cultural eutrophication.

30% 3. **Summarize** the best management practices that might be followed to reduce the **three** risks you list in Question 2.

**END OF QUESTION**

## QUESTION IV - FOREST ECONOMICS

### OBJECTIVE:

To demonstrate your understanding of basic forest economics principles and how forest practice regulations may affect a property's value.

### SITUATION:

Imagine that a proposal has been made for a California state regulation that would limit the harvesting of privately owned late seral/old growth stands to 10 percent of their volume per decade. You have been asked to estimate the financial change (gain or loss) to a particular private owner in present value terms (before income taxes) if this proposal was to become law.

### QUESTIONS:

- 25%      1. **Describe** the general method of analysis that you would use to determine the potential financial change to a forest owner of one such stand.
- 25%      2. **List** and **briefly describe** the types of data that you would need to make your evaluation.
- 25%      3. **Describe** how, in your financial calculation, you would handle **risk**.
- 25%      4. **List** the major steps that you would follow to perform the analysis.

**END OF QUESTION**

## QUESTION V - FOREST PROTECTION

### OBJECTIVE:

To demonstrate your knowledge of forest root diseases and their management in California forest types.

### QUESTIONS:

- 15%      1. Root diseases can be caused by both biotic and abiotic factors. They are often thought of as detrimental features in the management of forest stands. However that assumption may not be always correct. **Discuss three** possibly **beneficial** aspects **root diseases** may have in the ecology of a forest.
- 15%      2. Diagnosis of tree health problems involves identifying the cause from the symptoms, signs, and patterns of occurrence.
- A. **Define** symptoms.
  - B. **Define** signs
  - C. What are the patterns of occurrence of root diseases?
- 40%      3. Give the common or scientific names of three **(3) important fungal root diseases** found in commercial California conifers., **select two (2)** and **briefly discuss** the following:
- A. What species of trees are commonly attacked by the disease?
  - B. Give **two** examples of **symptoms** and **two (2)** examples of **signs** of each root disease.
  - C. What is the patterns of occurrence of each disease?
- 30%      4. Discuss **four (4) silvicultural methods or techniques** that have been used to control or manage **root disease spread** in California forests. *Note: You may discuss methods for **any** of the root diseases caused by fungi or abiotic factors, you do not need four methods for one specific disease. A more complete answer will indicate what root disease you think is **best managed** by each method you are discussing and how the silvicultural method will **help lessen** or combat that root disease.*

**END OF QUESTION**

**End of Part 1**

# Professional Foresters Registration Examination April, 2015

## Part II

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

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

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## QUESTION VI - FOREST ENGINEERING

### OBJECTIVE:

Demonstrate knowledge of modern logging technology and its use.

### QUESTIONS:

- 32% 1. **List four** basic components which make a Cut-to-Length (CTL) harvester unique and **describe the functioning** of these components.
- 24% 2. **Discuss four** factors which have led to the **increasing use** of the Cut-to-Length (CTL) harvester over the human system using timber fallers and buckers with chain saws in the U.S.
- 24% 3. **Discuss four** items which would be considered **disadvantages** for the Cut-to-Length (CTL) harvester over the human system using timber fallers and buckers with chain saws.
- 20% 4. In California, the favored automated ground-based harvesting system has **NOT** been the Cut-to-Length (CTL) harvester system. What type of automated ground-based harvesting system is **more favored** in California and **explain why**.

**END OF QUESTION**

## QUESTION VII - FOREST SILVICULTURE

### OBJECTIVE:

Demonstrate your knowledge of the silvicultural characteristics of young growth and old growth stands and their relationship to wildlife habitat.

### SITUATION:

Consider two adjacent stands. Each covers several hundred acres over similar topography, aspect, and soils. You may assume each stand is high timber growing site in either coastal redwood, California northwest Douglas-fir, or Sierra Nevada mixed-conifer vegetation types. Both stands border the same class I watercourse.

Stand "A" is old-growth and has never been entered for harvesting or stand treatment.

Stand "B" was indistinguishable from stand "A" until clearcut in 1930. Following harvesting, stand "B" was burned and rapidly regenerated by natural processes. Your predecessor has aggressively managed stand "B" as the company's "show-piece" example of even-aged, young growth sawtimber management. The history of this stand includes a sanitation salvage cut 40 years ago, a commercial thinning 25 years ago, and a combined biomass and commercial thinning 10 years ago. It is currently stocked at 70% of the normal yield table level, based on basal area, for its age.

### QUESTIONS:

50% 1. Briefly **compare and contrast** (one or two sentences only) each of the following current characteristics of old growth (OG) and young growth (YG) stands.

- A. Vegetation composition (in general terms, it is not necessary to use specific species names)
- B. Stand age structure
- C. Stand structure
- D. Net primary biomass productivity
- E. Biomass distribution, on site, by canopy level
- F. Forest floor structure
- G. Macro pools and cycling for the following minerals: N, P, K, C
- H. Current wood production
- I. Future wood production (next decade)
- J. Standing wood volume and value

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**QUESTION VII - Continued FOREST SILVICULTURE**

2. You have been directed to prepare a THP for the OG stand. The company desires to recover as much timber value as possible. They have also agreed with CA Dept. of Fish and Wildlife to maintain "suitable habitat" (per WHR analysis criteria) for all vertebrate species now existing in the OG stand. Before beginning to answer the following questions, **clearly state the vegetation type**, given in the introduction to this question, you are using.

5% A. **List two (2)** mammal, **one (1)** amphibian, and **two (2)** avian species most likely to inhabit the OG stand whose habitat may be at risk following a regeneration harvest (structural dependency is not implied).

10% B. **List five (5)** special characteristics of OG stand **structure** that you may wish to maintain in order to retain habitat for wildlife species commonly associated with OG stands.

15% C. What silvicultural method would you recommend to meet the requirements given above? **Explain and justify** your choice.

20% 3. When its' time to regenerate the **YG** stand, **list** and briefly **discuss ten (10)** measures you might take to allow the next rotation's stand to supply some of the habitat needs of species commonly found in the OG stand?

**END OF QUESTION**

## QUESTION VIII - FOREST ADMINISTRATION

### OBJECTIVE:

Demonstrate your knowledge of the notice requirement when proposing management activity in a watercourse or lake.

### SITUATION:

As part of s THP, a landowner must be aware of relevant California Department of Fish and Wildlife (DFW), regulations. To meet this responsibility, the Fish and Game Code (Section 1600) requires an entity to notify DFW of any proposed activity that may substantially modify the bank or bed of a watercourse or lake. If DFW determines that any forest management activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement (SAA) must be prepared. The RPF may act as the designated agent for the landowner. This question is intended to demonstrate your knowledge of this requirement.

### QUESTIONS:

- 30% 1. Briefly describe **three specific** conditions requiring you notify DFW of any proposed activity that may substantially modify a river, stream, or lake.
- 15% 2. Briefly describe **how** you would notify DFW.  
What is the **difference** between an "Agreement for timber harvesting" and a "Master Agreement for timber harvesting"?
- 40% 3. **Describe** in some **detail** what happens **after** the RPF or landowner **submits** the Streambed Alteration Agreement (SAA).
- 15% 4. Suppose a storm or some other disaster requires the performance of some in-stream work (e.g.-replace a large culvert) that, in the past, required a Streambed Alteration Agreement (SAA). What would you do to meet the needs created by the disaster?

**END OF QUESTION**

## QUESTION IX - FOREST POLICY

### **OBJECTIVE:**

Demonstrate your knowledge of the laws and agencies a RPF must work with to facilitate timber operations in California.

### **SITUATION:**

Assume that you have the responsibility for planning and supervising harvesting operation on an area of privately owned forestland in California.

### **QUESTIONS:**

- 10%            1. Identify **five (5)** separate **State** regulatory agencies, Boards or Commissions with which you may have to work in preparing and administering your THP.
- 45%            2. **List** and briefly **discuss** the **principal** laws through which each of the State agencies, Boards or Commissions (that you have listed in Question 1 above) have authority to impact forest practices.
- 45%            3. For the **five (5)** State agencies, Boards or Commissions that you listed in Question 1, **explain** how each interacts and **meets** its regulatory obligation.

**END OF QUESTION**

## QUESTION X - FOREST MANAGEMENT

### OBJECTIVE:

Demonstrate your understanding of the contractual features of temporary road use agreements and the responsibilities for roads under a Timber Harvest Plan (THP).

### SITUATION:

As an RPF you have a client who is a forest landowner. An adjacent landowner wishes to harvest timber on their neighboring property but must gain road access across your client's land. The appropriate road is already in place on your CLIENT'S property. Both properties are private TIMBERLAND.

### QUESTIONS:

70% 1. **List and defend ten (10) essential** provisions you should include in the temporary road use agreement to protect your client's interest.

10% 2. What is the responsibility of **any** Timberland Owner pertaining to road construction and maintenance on his own property?

10% 3. Under what circumstance is the Timber Operator responsible for the construction and maintenance of roads under a THP?

10% 4. Is it within the RPF scope of practice to develop or review a temporary road use agreement?

**END OF QUESTION**

**END OF EXAMINATION**