

Professional Foresters Registration Examination, April 8, 2022

PART I

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

Complete any Three (3) of Questions I through V.

**Question I Short Answer
Question II - Forest Ecology
Question III - Forest Policy
Question IV- Silviculture
Question V - Forest Protection**

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

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

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
CA	California
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

Applicant #: _____

Question # I

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

Question I - Short Answer

2% 1. What is Fire?

3% 2. How are wildland fires typically ignited?

3% 3. What is a fire regime?

3% 4. Once fuels have been ignited, what three (3) physical processes of fire move heat through the forest?

4% 5. What process do the pictures of the road on the next page illustrate? How does this affect hydrologic function?

Continued Next Page

Applicant #: _____

Question # I

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Continued Next Page

Applicant #: _____

Question # I

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

3% 6. What is a Log Erosion Barrier (contour log felling)? How does it function?

3% 7. What does this picture (below) depict and what is its function?



Continued Next Page

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

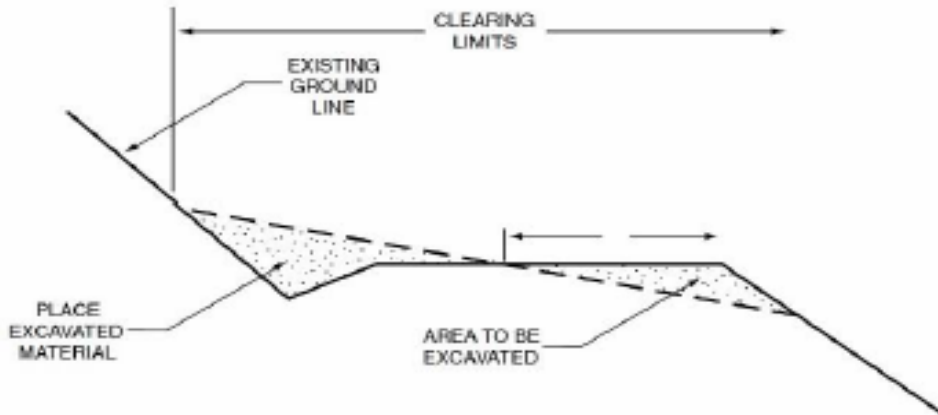


4% 8. What does this picture (above) depict in a post fire landscape and what is its function?

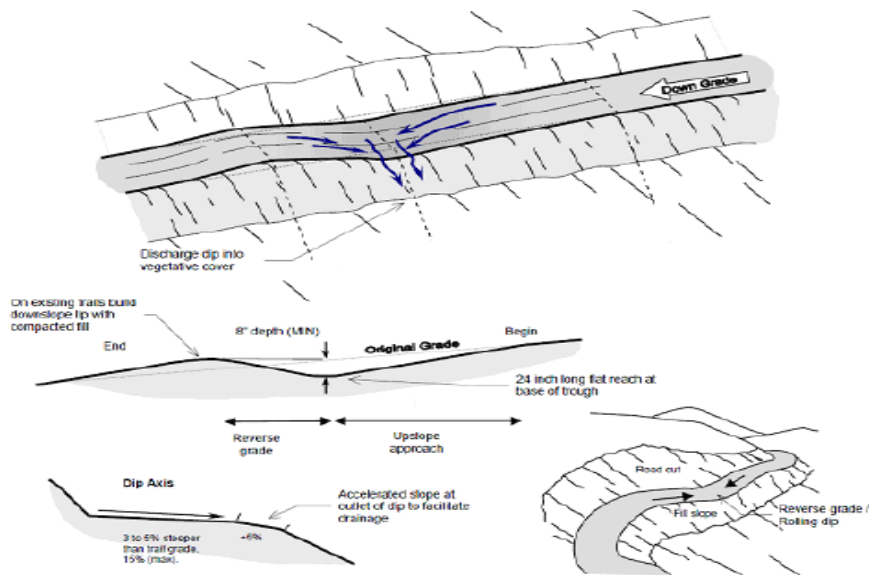
3% 9. What is Slash Spreading in a post fire landscape? What is its function? Where might this be effective?

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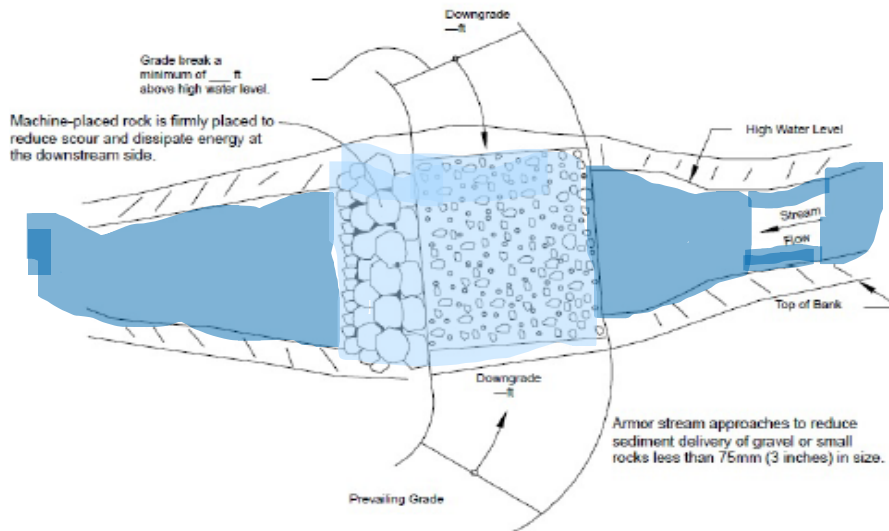
3% 10. What does this drawing (above) depict and what is its function?



Continued Next Page

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

3% 11. What does this drawing (above previous page) depict and what is its function?



3% 12. What does this drawing (above) depict and what is its function?

Continued Next Page

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.



3% 13. What does this picture (above) depict and what is its function in a post fire landscape?

4% 14. Briefly discuss the fire adaptive traits of trees. How do they function to protect trees?

4% 15. Briefly describe the various methods of reproduction that allow plants to occupy a post wildland fire plant community. Which method(s) facilitate rapid dominance?

Continued Next Page

Applicant #: _____

Question # I

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4% 16. Briefly discuss the primary effects on wildlife of wildland fire.

4% 17. What types of wildlife commonly benefit from wildland fire? Why?

4% 18. What happens to invertebrate populations after a wildland fire? Why?

4% 19. What general effects does wildland fire have on soils? What determines the amount soil change?

Continued Next Page

Applicant #: _____

Question # I

Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.

3% 20. What factors determine the amount of erosion that occurs after a wildland fire?

4% 21. Landowners who have different management objectives, may view wildland fire effects through differing lenses. Define the general linkage of management objectives to perception of fire damage versus benefits. Give an example of how different management objectives help define a landowner's view of what constitutes damage from wildland fire.

3% 22. Other than economics and safety, what are the potential benefits of fire salvage harvests?

4% 23. How does thinning a sawtimber stand from below influence its resilience to wildland fire?

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Applicant #: _____

Question # I

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3% 24. Regional Water Quality Boards and the State Water Resources Control Board in California have the authority to require monitoring and reporting as a condition of any applicable waiver of waste discharge requirements on Timber Harvest Plans. What is the legislative basis for this authority?

3% 25. What change in Cal Fire wildland fire suppression mission would be required to utilize Prescribed Natural Fire?

4% 26. Briefly describe the distinctions between effectiveness monitoring and implementation monitoring for a prescribed fire.

3% 27. *As used in the FPRs, what is a Significant Sediment Discharge?*

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Applicant #: _____

Question # I

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3% 28. After a wildland fire, timber owners may be able to deduct losses from federal taxes. How do they determine their deduction?

3% 29. For tax purposes, the cost, or the measure of your investment in the timber you own is the property's _____

3% 30. How is relative humidity typically measured in the field just before and during a prescribed fire?

END OF QUESTION # I

QUESTION II-FOREST ECOLOGY

OBJECTIVE

To demonstrate your understanding of forest recovery, rehabilitation, and restoration after large scale mixed intensity fire.

SITUATION

Extremely large forest fires covering hundreds of thousands of acres over varied terrain with fire effects ranging from stand replacement to light ground fire have become common in California. Even before the last flames are out, teams of resource specialists begin the daunting tasks of securing the sites and assessing what to do next. Assume you are a new RPF employed by a family forest landowner whose extensive holdings lie within a recent large scale fire perimeter. The family has gathered to ask you questions about the process of fire aftermath. You explain that timber salvage operations must begin as soon as possible. Some family members are concerned about recovery and rehabilitation of their forest apart from salvage. You answer the following questions about what to do other than salvage harvesting.

QUESTIONS

10% 1. What do you and we do first? How do we obtain our own information about how the fire affected our land?

10% 2. Our land is almost completely surrounded by US Forest Service.

(5%) **2a.** What type of monitoring and mitigation does the US Forest Service perform post fire? Describe what kind of resources may be provided that could be useful to you in evaluating our land?

(5%) **2b.** Are other public agencies able to provide assistance, and assessment with initial recovery and rehabilitation? Describe what will we ask them.

10% 3. Please describe the basic process you will follow to assess fire effects on our forest that require emergency action.

10% 4. Please describe the basic process you will follow to assess fire effects on our forest that warrant rehabilitation.

10% 5. Please describe what mixed intensity fire means. First explain burn intensity then describe three (3) levels of intensity and their effect on tree vegetation.

25% 6. Please describe the how you will assess surface burn severity. You produce and explain the following table to describe the effect of burn severity on the forest ground cover and soil. Complete the table on the following page and return with your answer. Use additional table for extra space or revisions.

25% 7. Based on your assessment, erosion control in High-Severity burn areas is the first treatment needed after emergency work and our fire effects assessment process.

(9%) **7.a.** Explain why and when erosion control work may be needed.

(16%) **7.b.** Discuss four (4) types of Hillslope erosion control you will consider. Where is it needed most? How does each control method work to mitigate erosion?

End of Question

Table 1. Burn severity classification.			
Soil and Litter Parameters	Burn severity Effects		
	Low	Moderate	High
Surface Organic Horizons (litter, humus, and rotten wood)			
Small Woody Debris (<3" diameter)			
Large Woody Debris (>3" diameter)			
Stumps			
Mineral Soil/Ash			
Indicators:			
Soil Organisms			
Nutrient Status			
Water Repellant Layers			
Erosion Potential			

Table 1. Extra Burn severity classification.			
Soil and Litter Parameters	Burn severity Effects		
	Low	Moderate	High
Surface Organic Horizons (litter, humus, and rotten wood)			
Small Woody Debris (<3" diameter)			
Large Woody Debris (>3" diameter)			
Stumps			
Mineral Soil/Ash			
Indicators:			
Soil Organisms			
Nutrient Status			
Water Repellant Layers			
Erosion Potential			

QUESTION III FOREST POLICY

OBJECTIVE:

To demonstrate understanding of public policy in limiting or facilitating the use of ecologically appropriate forest prescribed fire. Things change. When climate change and catastrophic fires induce a shift in public sentiment, legislators and agencies often respond with policy changes. RPFs must be prepared to adapt to those policy changes.

SITUATION:

Prior to 2020, existing law in California made a person who negligently, or in violation of the law, sets a fire, allows a fire to be set, or allows a fire kindled or attended by the person to escape onto any public or private property liable for the fire suppression costs incurred in fighting the fire, the cost of providing rescue or emergency medical services, the cost of investigating and making any reports with respect to the fire, and the costs relating to accounting for the fire and the collection of specified funds.

Prior to 2020, existing law authorized the Director of Forestry and Fire Protection to enter into an agreement for prescribed burning. That law required the agreement to designate an officer of the Department of Forestry and Fire Protection or a certified burn boss as the burn boss with final authority regarding the prescribed burning operation and to specify the duties of, and the precautions taken by, the person contracting with the department and any personnel furnished by that person. That law prohibits a person from knowingly setting or permitting agricultural burning unless that person has a valid permit.

Prior to 2020, existing California law required Cal Fire to suppress non-permitted wildland fires in State Responsibility Areas (SRA) as expeditiously as possible.

QUESTIONS:

60% 1. In October 2020, Governor Newsom signed Executive Order N-82-20, directing state agencies to accelerate actions to combat climate change, protect biodiversity, and build resilience through nature-based solutions.

“For the state’s forested landscapes, state agencies will promote landscape-scale forest management that safely reintroduce fire back on the landscape, support native species that depend upon fire to thrive...

Increased ecologically appropriate prescribed fire will also be important elements of the Climate Smart Strategy and Scoping Plan Update. Although these treatments will decrease forest carbon pools in the near term, in the long run, they will reduce forest density, promote the growth of larger, more fire-resistant trees, and create a mosaic of forests that are less vulnerable to uncontrolled wildfire and climate change.”

This led to the development of a Strategic Plan for Prescribed Fire, Cultural Burning, and Prescribed Natural Fire. In California’s Strategic Plan, how are the following terms defined and discussed?

(5%) 1.a. What is Beneficial Fire?

(10%) 1.b. How is Prescribed Fire described in California policy? What are its purposes?

(10%) 1.c. What is Cultural burning?

(10%) 1.d. Briefly describe the history, purposes, and the colonial, federal and state prohibition of Cultural burning in California.

Continued Next Page

(10%) **1.e.** What is Prescribed Natural Fire?

(9%) **1.f.** What is Pyrodiversity? Why is it important for forest stability?

(6%) **1.e.** List three (3) recent policies or plans by Cal Fire or the State Board of Forestry and Fire Protection intended to increase acceptance of Prescribed fire use . Briefly describe how they are intended to affect prescribed burning. Do not use the Strategic Plan for Prescribed Fire, Cultural Burning, and Prescribed Natural Fire.

40% 2. In October 2021, California adopted SB 332, Dodd. Civil liability: prescribed burning operations: gross negligence. This bill provided that no person shall be liable for any fire suppression or other costs otherwise recoverable for a prescribed burn if the burn be for the purpose of wildland fire hazard reduction, ecological maintenance and restoration, cultural burning, silviculture, or agriculture, and that, a certified burn boss review and approve a written prescription for the burn.

(10%) **2.a.** How would this bill enable more use of ecologically appropriate forest prescribed fire?

(30%) **2.b.** Advocates for prescribed burns say SB 332 is just one piece of the puzzle in creating a more welcoming environment for burns on privately owned land. Other than the fear of liability the bill seeks to address, discuss three (3) other legal, policy, regulatory, permitting, or liability obstacles that are not covered in the bill and potential solutions to increased forest prescribed fire.

END OF QUESTION

QUESTION IV-SILVICULTURE

OBJECTIVE

To demonstrate your understanding of the advantages and disadvantages of Silvicultural treatments intended to increase resilience of young growth mixed conifer stands to wildland fire.

SITUATION

Current conditions of many seasonally dry forests in the western United States leave them uncharacteristically susceptible to high-severity wildfire. Years of fire suppression coupled with increasingly extreme climate conditions have created such a high vulnerability to wildfire and drought that large-scale forest restoration cannot wait.

Dry forests throughout the western United States are fire-dependent ecosystems, and much attention has been given to restoring their ecological function. For this reason, land managers often are tasked with reintroducing the fire process via prescribed fire and fire-surrogate treatments (such as thinning and mastication). During planning, foresters are expected to anticipate the effects of management actions on forest structure, ecological function, and future fire behavior. In the case of fire surrogate treatments, managers must understand which stand components or processes are changed or lost, and with what effects, if treatments such as thinning, and mastication are used instead of fire or in combination with fire.

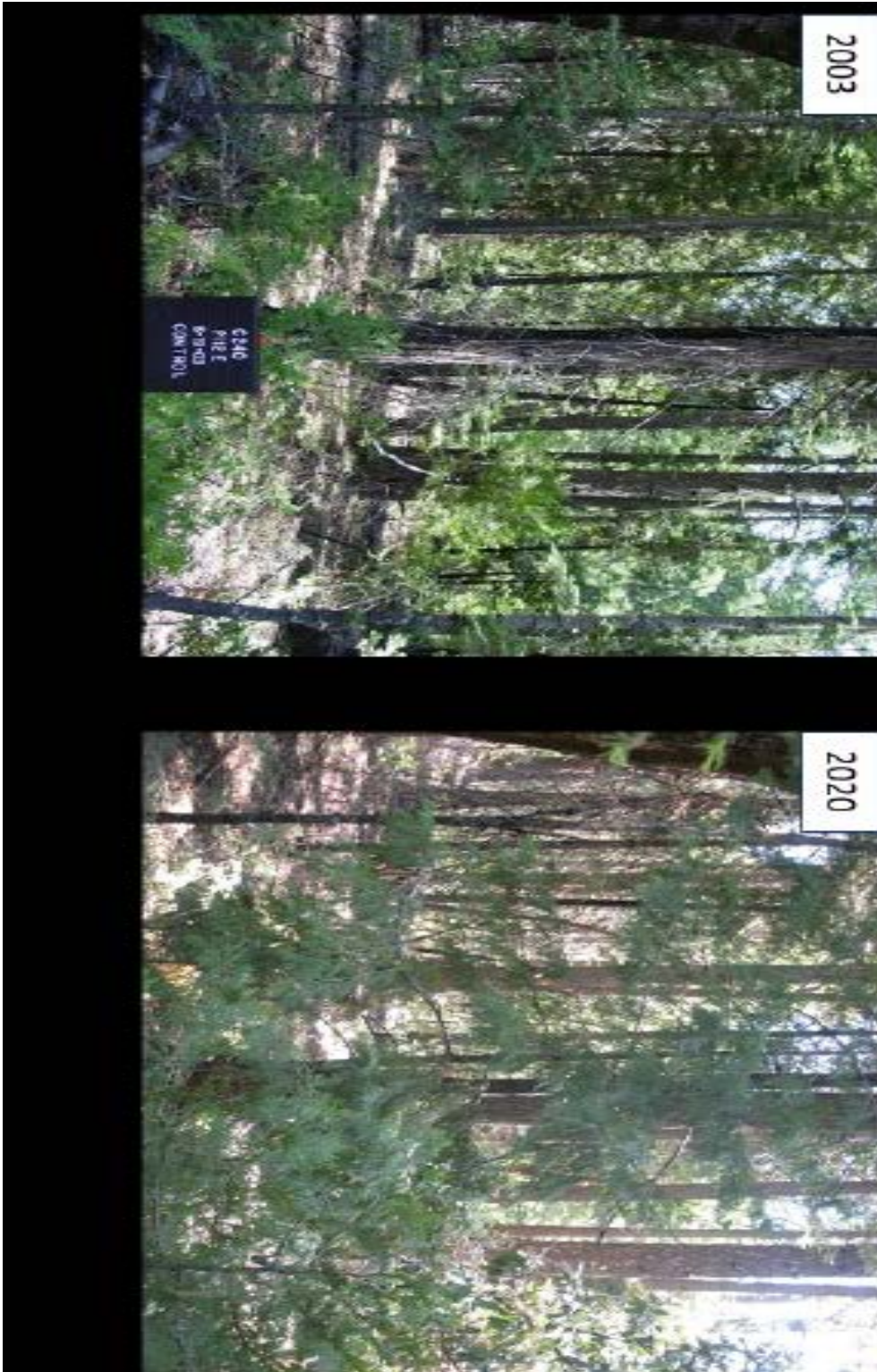
After 20 years of research and over 40 publications, the Fire and Fire Surrogate Study (“Study”) has evaluated combinations of silvicultural treatments success in meeting fuel reduction objectives to create forest stands more resilient to wildfires. The Study is comprised of a network of twelve young growth mixed-conifer and Black oak stands, ranging in size from 45-70 acres, each of which was randomly assigned one of four possible treatments. The stands all had a similar history of natural regeneration after seed tree harvest circa 1920-1927. Developing young growth sawtimber stands were then managed by group selection form 1977-2001. To date, only the stand matrices (not the regeneration gaps) were treated. All stands were similar before treatments. The treatment options initiated were:

- 1) Control: no further active management.
- 2) Fire-only: Fall prescribed fire applied to the forest stand.
- 3) Mechanical-only: Commercial thinning from below slightly favoring retention of pines, which removed sawtimber sized trees, followed by mastication, which chipped/shredded sub-merchantable trees in place leaving 10% of them in clumps throughout the forest stand.
- 4) Mechanical + fire: same mechanical treatment described above, followed by Fall prescribed fire.

Each treated stand has been entered several times over 20 years following the same treatment option. Results of treatments are depicted in the following photographs.

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Photo sequence of typical control plot. No treatments Stand density ~ 220 Ft SQ / Ac BA



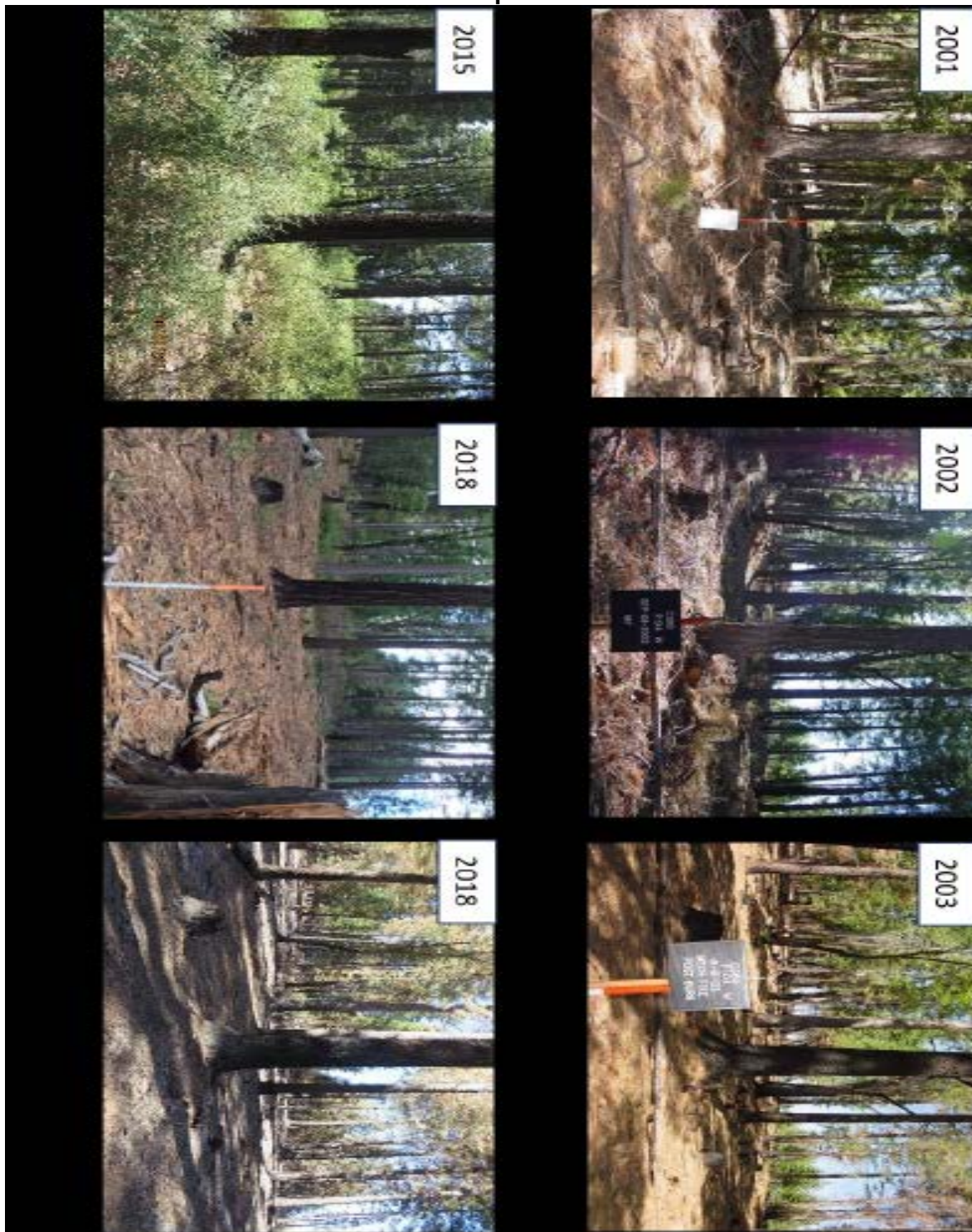
Below: Photo sequence of typical prescribed fire only treatments. 2002=pre-treatment, 2003=after first burn, 2009=before second burn, 2010 =after second burn, 2017, 2018- before and after third burn.



Below: Photo sequence of typical mechanical (commercial thin + mastication) only treatments. 2001=pre-treatment, 2003=after first mechanical (commercial thin (to ~ 150 sq.ft.ba/ac) + mastication), 2015 =regrowth, 2019- after second mechanical (commercial thin + mastication).



Below: Photo sequence of typical mechanical (commercial thin + mastication) PLUS FIRE treatments. 2001=pre-treatment, 2002=after first mechanical, 2003=after mechanical and first burn, 2015 =regrowth, 2018- after second mechanical and subsequent second burn.



QUESTIONS

28% 1. Compare and contrast the wildfire resilience visible in the photos of each treatment type at four different times: a. before treatment, b. after first treatments, c. after regrowth but before second treatments, and at the d. end of ~20 years. What are your expectations about modeled fire behavior at the end of treatments?

You may complete the following table *in lieu* of a prose discussion.

Continued Next Page

Applicant #: _____

Resilience Question #: _____

Complete table on this page, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.

Treatment	Before treatments	After first full treatment	After regrowth but before second treatments	After last treatment
Control		NA	NA	
Fire Only				
Mechanical Only				
Mechanical + Fire				

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Applicant #: _____

Resilience Question #: _____

Complete table on this page if you need additional space or make revisions, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.

Treatment	Before treatments	After first full treatment	After regrowth but before second treatments	After last treatment
Control		NA	NA	
Fire Only				
Mechanical Only				
Mechanical + Fire				

Continued on Next Page

28% 2. Compare and contrast (for this young growth site I, 80-year-old managed stand) the carbon sequestration and carbon storage visible in the photos of each treatment type at four different times: a. before treatment, b. after first treatments, c. after regrowth but before second treatments, and at the d. end of ~20 years.

You may complete the following table in lieu of a prose discussion.

Continued on Next Page

Applicant #: _____

Carbon Question # _____

Complete table on this page, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.

Treatment	Before treatments	After first full treatment	After regrowth but before second treatments	After last treatment
Control		NA	NA	
Fire Only				
Mechanical Only				
Mechanical + Fire				

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Applicant #: _____

Carbon Question # _____

Complete table on this page if you need extra space or decide to make revisions, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.

Treatment	Before treatments	After first full treatment	After regrowth but before second treatments	After last treatment
Control		NA	NA	
Fire Only				
Mechanical Only				
Mechanical + Fire				

Continued on Next Page

10% 3. Assume you are a RPF responsible for cooperatively managing several thousand contiguous acres of family forests similar to those in the study. The owners are interested in protecting, and recovering economic value, enjoying recreation, wildlife, and hunting. They are seriously concerned about catastrophic fire loss. Explain and justify which of the four described treatments, if any, are you interested in recommending to the owners?

14% 4. Recommend a new fifth alternative sequence of treatments that differs from those four described above that you could recommend to the owners above the others. Explain and justify your recommendation.

10% 5. This study utilized Fall prescribed fires. How might Spring prescribed fire affect the results?

10% 6. The 7- to 30-year-old group regeneration areas within stands were not intentionally treated in this study. How might they react to the four treatment alternatives? How might potential adverse effects be mitigated?

END OF QUESTION

QUESTION V- FOREST PROTECTION

OBJECTIVE:

To demonstrate understanding of forest fuel management and fire.

SETTING:

The timberland of California. Understanding the various forest fuels, their effects on fire, methods of management and resulting effects is essential to maintain sustainable California wildlands.

QUESTIONS:

- 2% 1: What is Fire?
- 3% 2. What are the three (3) components required to have a forest fire?
- 12% 3. Define the following six (6) properties that describe forest fuels: Chemistry, Compaction, Continuity, Load, Moisture Content, and Size.
- 14% 4. Define the following seven (7) forest fuel types: activity fuel, aerial fuel, fine fuel, ground fuel, heavy fuel, ladder fuel, and surface fuel.
- 10% 5. The wildlands of California are often naturally fire prone thus most of the natural communities of plants and animals have adapted to natural fire conditions. Discuss four (4) significant factors that have contributed over the past century to greatly increasing the intensity, rate of spread, as well as the annual acreage burned on these lands.
- 5% 6. What is Fuel Management?
- 10% 7. What are five (5) of the potential benefits of Fuel Management?
- 10% 8. What are five (5) of the potential disadvantages of Fuel Management?
- 10% 9. Crown fires are the most damaging type of forest fires. Independent crown fires are common when wildfires burn under extreme weather conditions of ultra-low humidity and strong winds.
- Other than during these extreme conditions, what are the requirements for dependent crown fire initiation and continuance under less than extreme weather conditions? Why? How does this knowledge guide fuel management decisions?
- 24% 10. Any particular fire's behavior is determined by the weather, topography, and fuel.
- (12%) 10.a. How does topography affect fire behavior?
- (12%) 10.b. How does weather affect fire behavior?

End of Question

Professional Foresters Registration Examination April 8, 2022

Part II

**Applicant Must Also Answer Three (3) of the Remaining Five
Essay Questions in Part II**

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

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

QUESTION VI - FOREST MENSURATION

OBJECTIVE:

To demonstrate your ability to perform certain mensurational tasks.

SITUATION:

You are a RPF for a Land and Timber Company. You are directed to examine and report on a tract of timberland that is available for purchase. The legal description of each parcel is shown below:

All of the Following are in T10N, R12E, Anywhere B & M

1. All of Section 13
2. All of Section 24
3. N $\frac{1}{2}$ Section 14
4. NW $\frac{1}{4}$ Section 22
5. S $\frac{1}{2}$ S $\frac{1}{2}$ Section 22
6. SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 23
7. S $\frac{1}{2}$ S $\frac{1}{2}$ SW $\frac{1}{4}$ Section 15

QUESTIONS:

5% 1. What is the Public Land Survey System (PLSS)? What agency now manages this system?

10% 2. What is the design of the Public Land Survey System (PLSS)?

5% 3. Why are some PLSS results not normal and standard sizes and shapes?

5% 4. Within a township, where are sections most likely to not be normal and standard sizes and shapes. Why?

15% 5. Assuming that the legal descriptions indicated above consist of sections with normal and standard sizes and shapes for the public land survey, plot the ownership on the plat provided on the last page of this question. Also state what is the acreage of each parcel and total acreage in the tract of land to be examined?

Remove the plat from this question packet and RETURN AND INCLUDE with your answer packet. Be sure to fill in your Applicant Number on the Plat.

20% 6. Your Land and Timber Company has requested that you conduct a 100% cruise on each of the parcels listed above that is 40 acres or less; a 10% line- plot cruise on each area that is greater than 40 acres but less than 1 section; and a 5% line- plot cruise on each parcel of 1 section or greater.

Continued Next Page

(10%) **6.a.** What is the number of sample plots required if your sampling unit is a 0.1-acre circular plot in?

Section 13?

Section 22?

(10%) **6.b.** What is the spacing between lines of plots in?

- 1) Section 13 if your plots are on 4-chain spacing between plots?
- 2) Section 14 if your plots are on 2-chain spacing between plots?

20% 7. You decide to localize the volume tables you will be using.

- (10%) **7. a.** Briefly describe how a volume table is localized.
- (10%) **7.b.** Discuss the advantages of this procedure.

10% 8. Throughout the area there are openings of anywhere from 2 to 10-acres that support Christmas trees. You recognize that most of the property value is in the timber, but the Christmas tree potential could be another source of income. How should this be accounted for in your report?

(5%) **8.a.** What data would you tally while at the sample plots that will give you the necessary information for Christmas tree management?

(5%) **8.b.** Describe a rapid means of estimating average annual height growth for a Christmas trees species that you are familiar with. Be sure to specify the species that you are discussing.

10% 9. On completion of fieldwork you develop the following gross sample volumes for Section 14.

Pine	350 MBF
Fir	400 MBF
Total	750 MBF

- (5%) **9.a.** Assuming that stand conditions are relatively uniform across the cruised area, what are the total gross volumes by species in Section 14?
- (5%) **9.b.** Is it necessary to make any other calculation or adjustment to these volumes before using them to estimate timber value? If so, what are they and why are they made?

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Applicant # _____ Question # _____

Complete table on this page, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.

T _____ R _____ B&M

TYPICAL TOWNSHIP FOR A PUBLIC LAND SURVEY

What is the total acreage in the tract that you will be examining? _____

END OF QUESTION

QUESTION VII-FOREST ENGINEERING

OBJECTIVE

To demonstrate your understanding of road design to ensure where feasible, the hydrologic disconnection of road segments and logging road drainage from watercourses.

SITUATION

As a new RPF, you are part of a team developing salvage harvest in a 500-acre sub-watershed recently damaged by a severe intensity wildfire. The landowner desires to upgrade the 50-year-old pre-fire access system as part of salvage operation. You are assigned to evaluate existing road system and recommend any actions needed to mitigate fire effects and hydrologically disconnect the upgraded permanent road access system from the watercourses.

After some office research and an initial brief site visit you describe her property as a Southwest facing area at 3,500 to 4,500-foot elevation extending from a main West – East trending ridge down through several mid slope benches to a Class I stream. Side slopes range from 15% to 50%. The granitic soils are good site II, well but irregularly stocked with mixed conifer and hardwood young growth sawtimber before the fire. There are many seasonal draws and several springs originating class II watercourses.

QUESTIONS

20% 1. Hydrologic Disconnection

(5%) 1.a. What is hydrologic disconnection?

(5%) 1.b. What is the goal of hydrologic disconnection?

(5%) 1.c. Why is hydrologic connection of roads to the watershed bad?

(5%) 1.d. How is hydrologic disconnection achieved?

50% 2. This property access is by existing mid slope poorly maintained ranch style roads. These roads are used year-round by light vehicles (pick-up trucks) but are not adequate for salvage logging use. All existing roads are native surface crowned with outside berms or in-sloped with inside ditches and cross drain culverts (plastic that were destroyed in the fire). There are areas of fire induced hydrophobicity in the sandy soils throughout the property.

(15%) 2.a. What is the significance of hydrophobic soil?

(10%) 2.b. List ten (10) key road conditions and areas near roads to consider when evaluating the hydrologic connectivity of logging road segments with a high number of watercourse crossings. Indicate the items that apply to your situation described above.

Continued Next Page

(15%) **2.c.** List and briefly describe five (5) primary road (not watercourse crossing) engineering treatments to mitigate the potential of hydrologic connectivity from the ranch roads?

(10%) **2.d.** Which of these treatments will you recommend as the primary treatment(s) to mitigate the potential of hydrologic connectivity from the roads? Why?

30% 3. All existing class II and Class III watercourse crossings have 30- to 50-year-old corrugated plastic culverts designed to pass 2% annual probability water flows. All culverts (plastic) were destroyed in the fire.

(15%) **3.a.** List, explain and justify the design and treatment measures you propose for Class II crossings to mitigate the potential of hydrologic connectivity of the road.

(15%) **3.b.** List, explain, and justify the design and treatment measures you propose for Class III crossings to mitigate the potential of hydrologic connectivity.

END OF QUESTION

QUESTION VIII-FOREST ECONOMICS

OBJECTIVE

To demonstrate your understanding of basic economic theory as it applies to forest products and markets.

SITUATION

Log and lumber markets can sometimes change significantly over short periods of time. The following is an example of one such change.

Skyrocketing lumber prices in 2020 and 2021 caused the average price of a new single-family home to increase by nearly \$30,000. The framing lumber prices dropped significantly from their peak in May 2021, then began trending upward yet again.

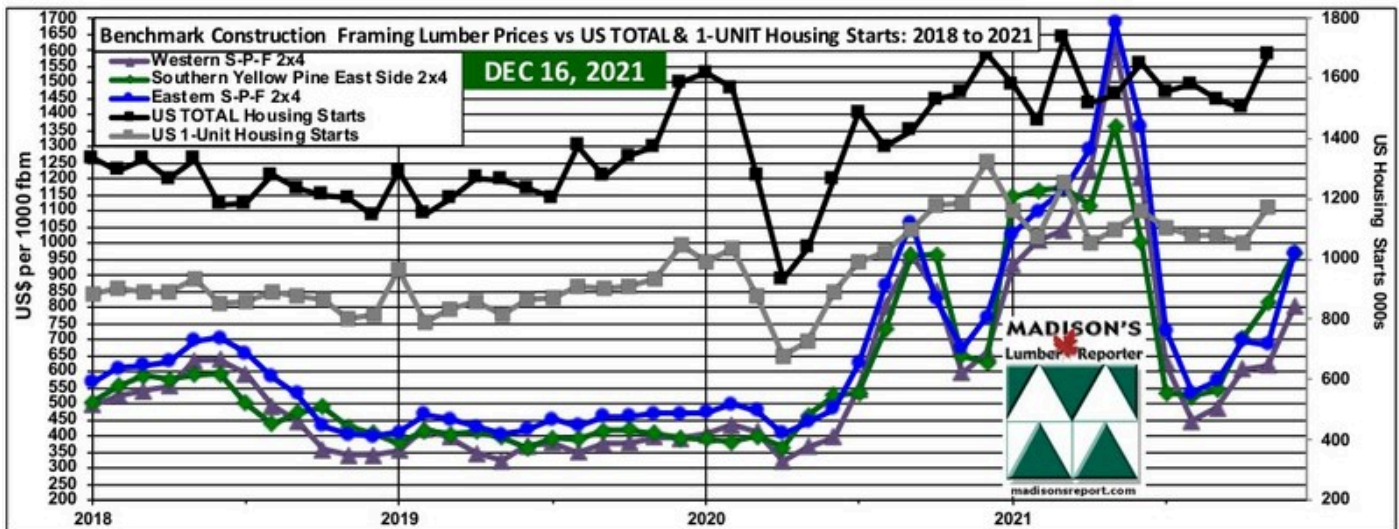
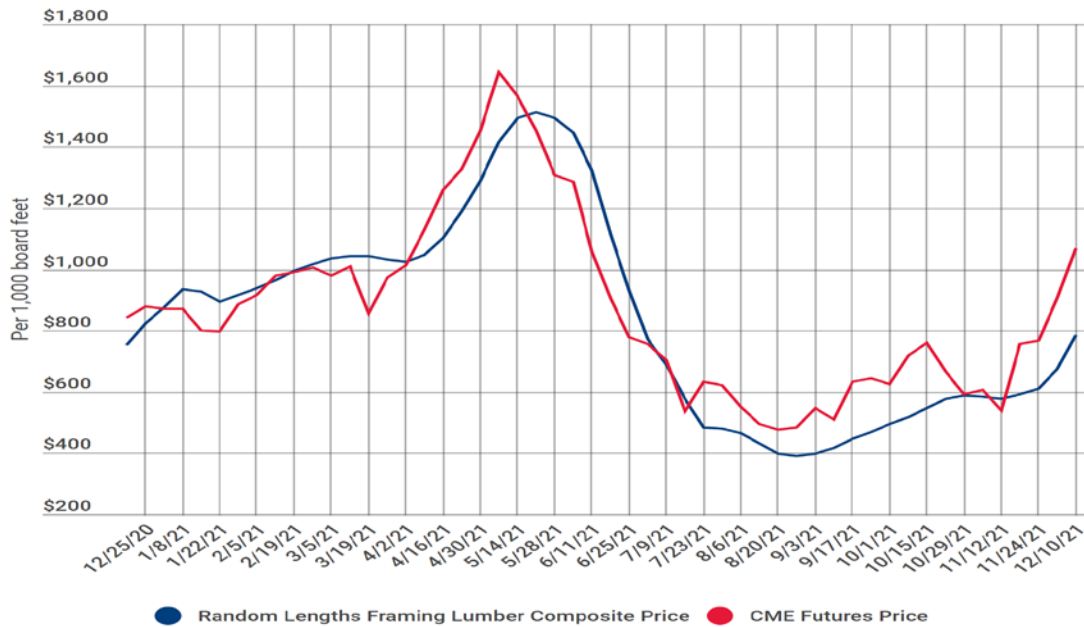
Domestic framing lumber, housing starts, and home mortgage rates are depicted in the following graphs.

The price tracker below provides an overview of the behaviors within the U.S. framing lumber pricing market. The information is sourced each week using the Random Lengths Framing Lumber Composite which is comprised using prices from the highest volume-producing regions of the U.S. and Canada.



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Below are most recent lumber price data.

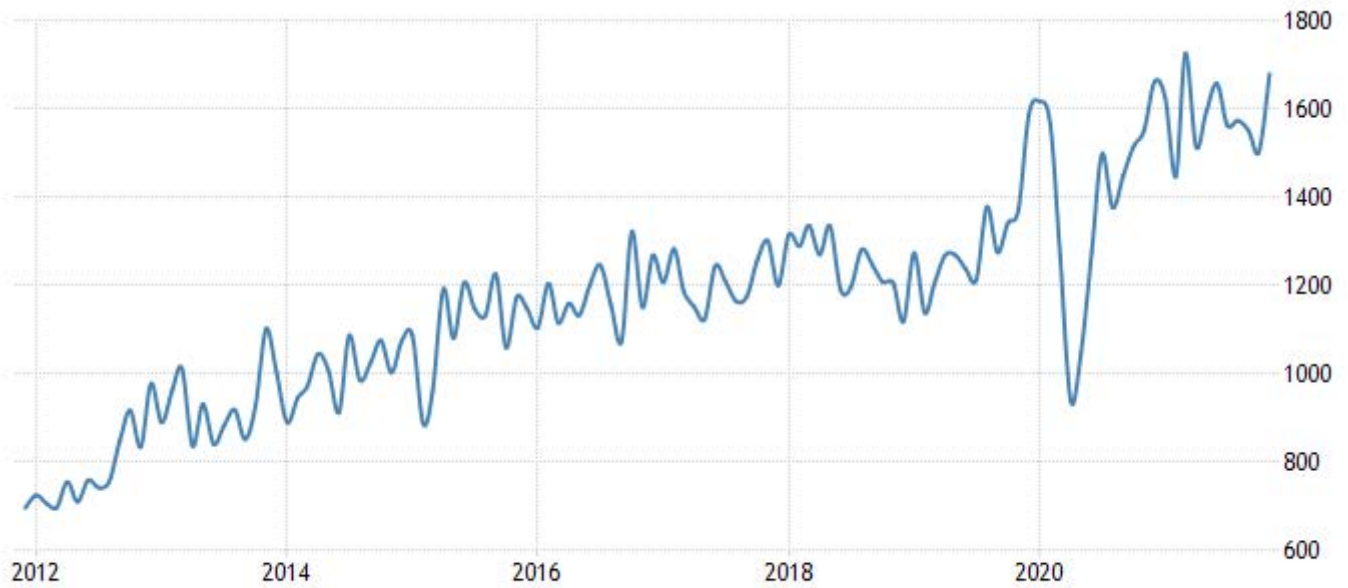


Above Millions of housing starts annually and lumber prices

Lower three (green, blue, and gray triangles) are lumber prices. Upper black line housing starts.

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Average US housing starts below



SOURCE: TRADINGECONOMICS.COM | U.S. CENSUS BUREAU

Housing mortgage interest rate



SOURCE: TRADINGECONOMICS.COM | MORTGAGE BANKERS ASSOCIATION OF AMERICA

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QUESTIONS:

45% 1. What recent economic, catastrophic fire, social and weather events have affected short-term behavior resulting in price spikes in the Western lumber market? Discuss these economic events and the social, environmental and policy changes that helped create them.

Why did stumpage and log prices decline in some parts of California even while regional lumber prices increased? Refer specifically to the situation given above.

20% 2. Explain the relationship of changes in price and harvest volume in terms of simple economic concepts. Draw two graphs one showing the relationship of price, harvest volume (supply) and the other demand that reflects conditions of each both before and after changes occur. Be sure to label your graphs.

20% 3. In addition to new home construction, briefly describe two (2) other major domestic markets that utilize or consume dimension lumber.

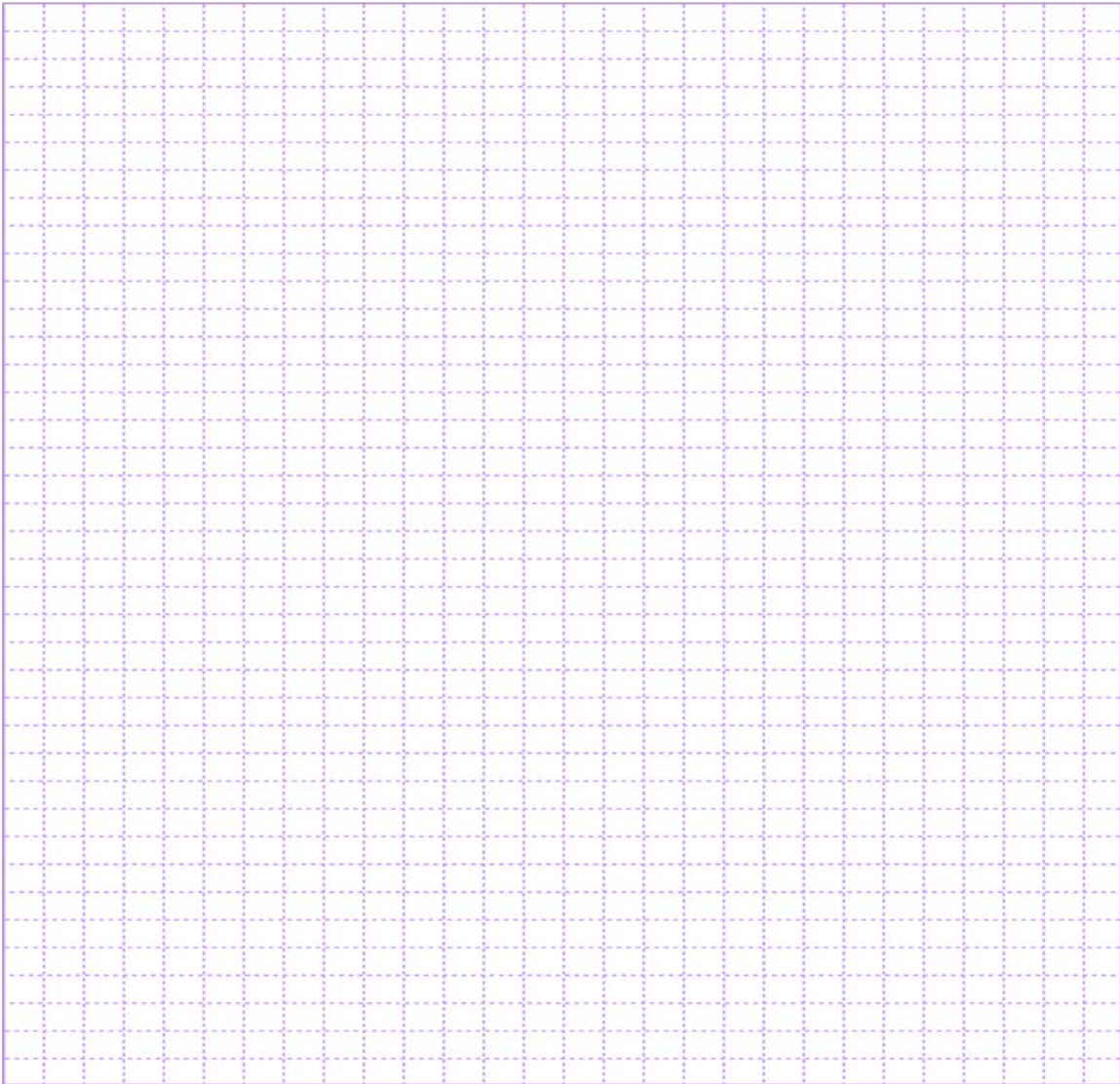
15% 4. Discuss how changes (increase and decrease) in stumpage price in California might affect:

- a. log imports/exports
- b. non-wood building materials
- c. land use, land management and environmental concerns

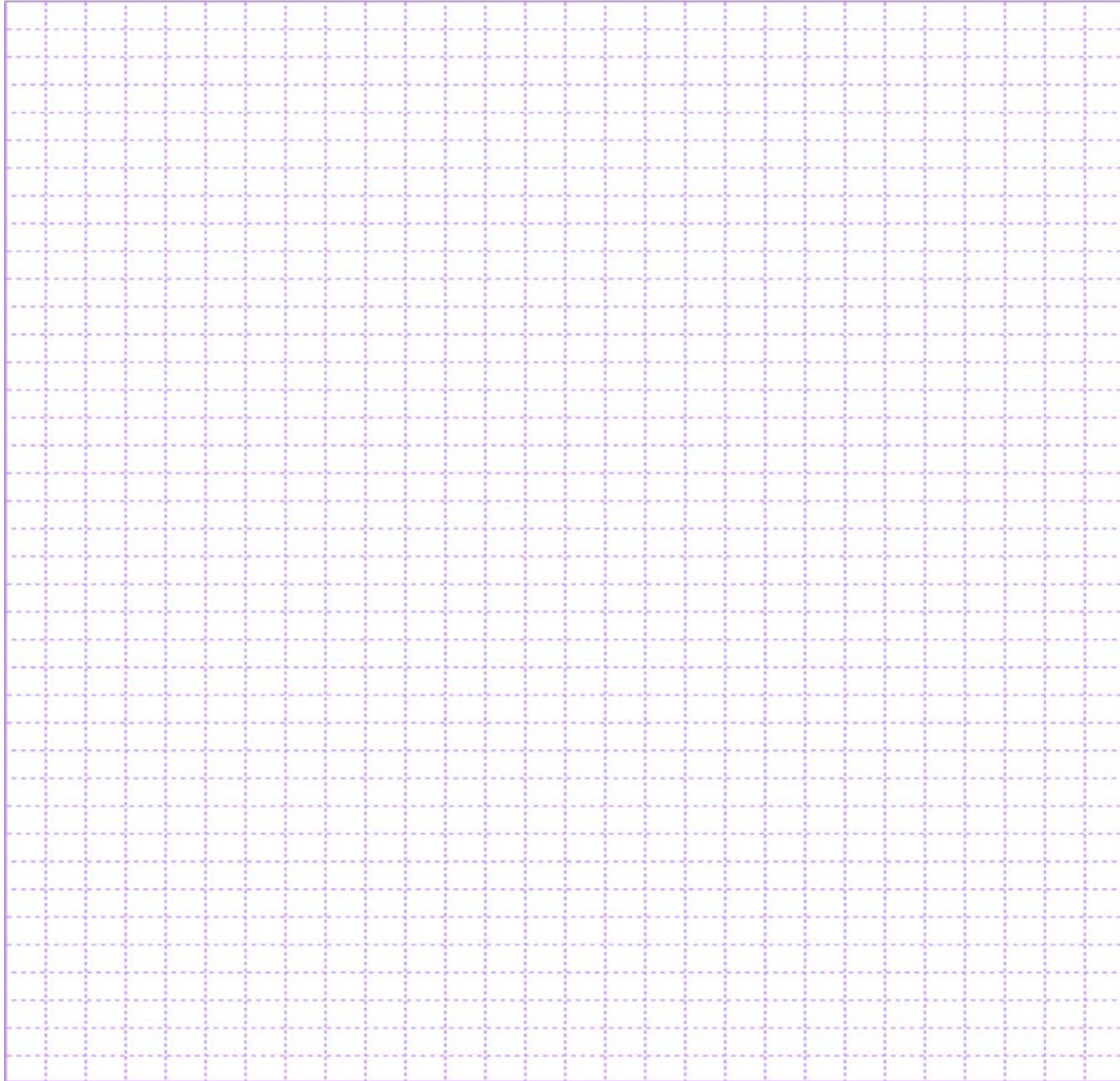
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Applicant #: _____ Question # _____

Complete graph on this page, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.



If you need a graph to replace draft graph, Complete graph on this page, tear from the booklet and submit with the answer packet if you chose to answer this Question of this examination.



END OF QUESTION

QUESTION IX- FOREST ADMINISTRATION

QUESTION:

OBJECTIVE: To demonstrate understanding of the RPF role in reviewing timber harvest plans

SITUATION: As a new RPF you have been employed to develop comments for submission during review of THPs. Your employer is a County with FPR county rules. Your first review is a THP proposed for a standard quarter section of TPZ land in the Northern Forest district. The County is concerned that this project creates a *de facto* subdivision. The site II young growth sawtimber is located along a minor East to West trending ridge. All the slopes are $\leq 30\%$. There are no listed species issues. There are no critical erosion sites. There are no watercourse issues. There are no existing or approved public agency community fuelbreaks.

The plan access system proposes a reconstructed permanent road at the ridgeline along an existing ranch road, four (4) new permanent mid-slope roads roughly parallel to the ridge road with two roads spaced approximately 10 chains and 20 chains below the ridge on each side of the ridge. Tractor skidding to 0.5-acre landings spaced ~ every 10 chains along each of the four new roads is proposed. There are 16 landings proposed. All roads have 20-foot width design specifications.

Fuelbreak/Defensible Space silviculture is proposed for a 400-foot-wide strip straddling the ridge. Elsewhere, group selection silviculture is specified with sixteen two acre roughly square regeneration gaps flagged, one next to each landing. The proposed regeneration gaps are to have tractor pile and burn site preparation and natural regeneration. See rough plot map on the next page.

The feasibility analysis addressed “no project” and variation in space and time alternatives.

QUESTIONS:

100% 1. Explain and justify each of the following comments you propose to submit to CalFire review team on behalf of the County.

(20%) **1.a.** The County is concerned that the proposed plan would lead to a future subdivision. The county has not received an application to rezone for residential use or withdraw from TPZ. This would possibly subvert the County subdivision map act review and approval process.

(10%) **1.b.** The proposed ridgeline road reconstruction is not necessary for timber harvesting.

(10%) **1.c.** All the proposed roads are excessively wide for timber harvesting.

(10%) **1.d.** All the landings are too large.

(10%) **1.e.** There is excessive acreage designated for regeneration groups.

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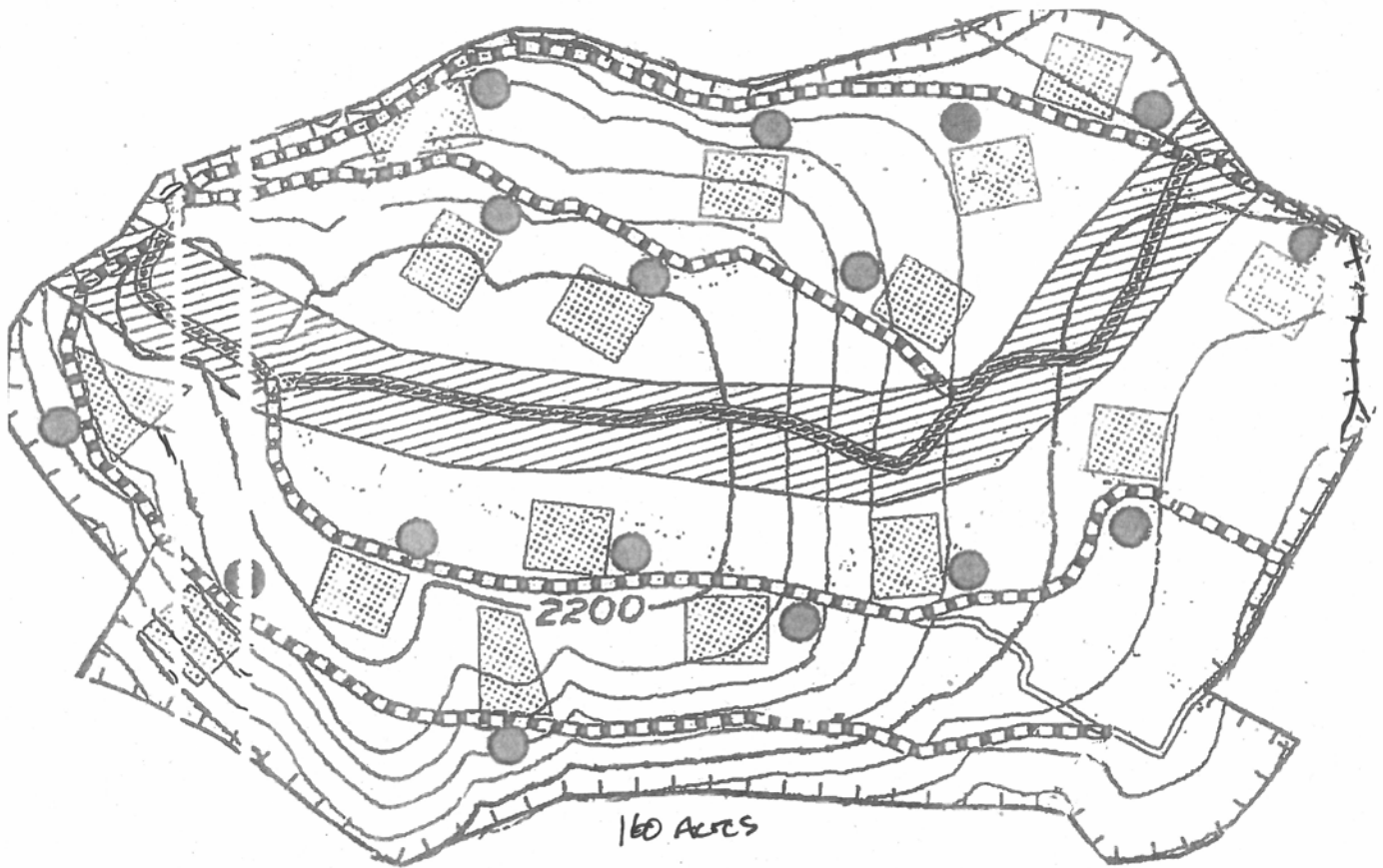
(10%) **1.f.** The regeneration gaps are too large for natural regeneration.

(10%) **1.g.** Fuelbreak/Defensible Space silviculture is inappropriate.

(10%) **1.h.** There are significant alternative projects that were not addressed in the feasibility analysis.

(10%) **1.i.** The County will appeal if the THP is approved in its present form.

Map Next Page



T12N, R6W, Sec 31 MDS&M



Harvesting Boundary - Group Selection



Group Openings



Fuelbreak/Defensible Space



Existing Permanent



Proposed Reconstruct



Proposed Landings



Proposed Permanent

End of Question



QUESTION X- FOREST MANAGEMENT

OBJECTIVE:

To demonstrate your ability to manage post catastrophic wildland fire recovery and salvage for a small family forest.

SITUATION:

You are a newly minted RPF and have been tasked by a small landowner to recover salvage value reestablish the forest resources on their 160-acre parcel. The parcel has been held for generations but has no structures and was used as a family hunting/camping location. You have been hired days following the control of a catastrophic wildfire that impacted 150 acres of the property with varying levels of intensity ranging from moderate to severe. The parcel in question was fully occupied by a young growth sawtimber stand. Your initial review indicates a net positive salvage operation is possible. Based on your experience, you may select either a coastal or interior forest type for this question. Please remember to state all your assumptions.

Questions & Answers:

- 10 % 1. Identify the data resources you would require to proceed with the project.
- 15% 2. Identify how you would determine/verify the levels of fire intensity? How would the fire intensity affect your management decisions?
- 10% 3. What harvest documents would you utilize and why? Please identify a secondary option as first choice might not fit entire property or management direction.
- 10% 4. Explain how you would recommend managing the remaining 10 acres that was not affected by the fire.
- 10% 5. To market the timber what data would you include in a prospectus to the various stumpage or log purchasers.
- 30% 6. To recover the property's productivity, outline a management plan for the next 20 years identifying all interventions, their timings, and objectives. Bullet point list acceptable.
- 5% 7. Identify any limitations or hurdles that may be encountered that may complicate your recovery strategy.
- 5% 8. Identify any environmental requirements from agencies other than CAL FIRE that are necessary.
- 5% 9. What other issues or opportunities should you investigate to support the landowners.

End of Question

END OF EXAMINATION