

Prescribed Fire Plan Preparation RX-341



NFES 1622

Instructor Guide
JUNE 2009



CERTIFICATION STATEMENT

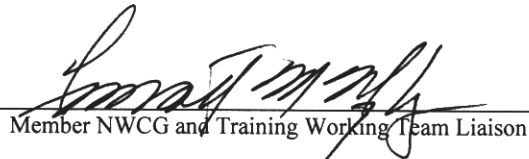
on behalf of the

NATIONAL WILDFIRE COORDINATING GROUP

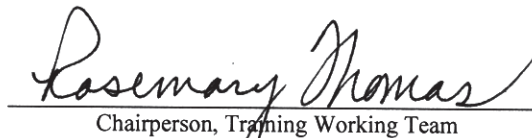
The following training material attains the standards prescribed for courses developed under the interagency curriculum established and coordinated by the National Wildfire Coordinating Group. The instruction is certified for interagency use and is known as:

Prescribed Fire Plan Preparation, RX-341
Certified at Level I

This product is part of an established NWCG curriculum. It meets the COURSE DEVELOPMENT AND FORMAT STANDARDS – Sixth Edition, 2003 and has received a technical review and a professional edit.


Member NWCG and Training Working Team Liaison

Date 6/27/2009


Chairperson, Training Working Team

Date 6/23/2009

Prescribed Fire Plan Preparation RX-341

**Instructor Guide
JUNE 2009
NFES 1622**

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Comments regarding the content of this publication should be directed to:
National Interagency Fire Center, Fire Training, 3833 S. Development Ave., Boise, Idaho 83705.
E-mail: nwcg_standards@nifc.blm.gov.

Additional copies of this publication may be ordered from National Interagency Fire Center,
ATTN: Great Basin Cache Supply Office, 3833 South Development Avenue, Boise, Idaho 83705.
Order NFES 1622.

NWCG TRAINING WORKING TEAM POSITION ON COURSE PRESENTATION AND MATERIALS

The recommended hours listed in the FMCG are developed by Subject Matter Experts based on their estimation of the time required to present all material needed to adequately teach the unit and course objectives. The hours listed may vary slightly due to factors such as number of students, types and complexity of course activities, and the addition of local materials. NWCG does not approve of course delivery varying greatly from the recommended course hours. Instructors and students are cautioned that in order to be recognized as an NWCG certified course, certain guidelines must be followed:

- Lead instructors are encouraged to enhance course materials to reflect the conditions, resources and policies of the local unit and area as long as the objectives of the course and each unit are not compromised.
- Exercises can be modified to reflect local fuel types, resources and conditions where the student will be likely to fill incident assignments. The objectives and intent of the exercises must remain intact.
- Test questions may be added that reflect any local information that may have been added to the course. However, test questions in the certified course materials should not be deleted to ensure the accurate testing of course and unit objectives.
- Test grades, to determine successful completion of the course, shall be based only on the questions in the certified course materials.

If lead instructors feel that any course materials are inaccurate, that information should be submitted by e-mail to NWCG Fire Training at nwcg_standards@nifc.blm.gov. Materials submitted will be evaluated and, where and when appropriate, incorporated into the appropriate courses.

COURSE LENGTH FOR NWCG COURSES

If a course is available through PMS, the recommended course hours and the “NWCG Position on Course Presentation and Materials” will be adhered to by the course instructors.

- Unit times represent the allotted time to teach the unit and complete the exercises, simulations, and tests.
- Recommended course hours are given to help the students and the course coordinator with planning travel, room reservations, and facilities usage. This represents the time estimated to present the NWCG provided materials including time for breaks, lunch periods, set-up for field exercises or simulations, etc.
- Actual times for both the unit and the course may vary based on number of students, types and complexity of course activities, and the addition of local instructional materials.

If the course is not available through PMS, e.g., L-380, and has been developed using NWCG course criteria, minimum course hour requirements have been established and must be adhered to by the course developer and course instructors.

Course hours for all NWCG courses can be found in the Field Manager’s Course Guide (<http://www.nwcg.gov/pms/training/fmcg.pdf>). If the hours are a minimum versus recommended they will be stated as such.

PREFACE

Prescribed Fire Plan Preparation, RX-341 is a recommended training course in the National Wildfire Coordinating Group (NWCG), wildland fire curriculum. This course was developed by an interagency group of experts with direction and guidance from NWCG Training under authority of the NWCG. The primary participants in this development effort were:

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The Nature Conservancy, Georgia

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Bureau of Land Management, NIFC

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Fish and Wildlife Service, NIFC

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Bureau of Land Management, NIFC Fire Training

The NWCG appreciates the efforts of these personnel and all those who have contributed to the development of this training product.

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COURSE INSTRUCTIONS

This section contains instructions and information essential to the course coordinator and instructors in making an effective presentation. Cadre members must read this section and be thoroughly familiar with course procedures and material prior to presentation.

I. INTRODUCTION

Prescribed Fire Plan Preparation, RX-341 is a 36-hour course designed to provide students with the skill/knowledge to prepare a prescribed fire plan for technical review and approval in accordance with agency policy and guidelines.

The course is based on the 21 required elements of a prescribed fire plan identified in the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide.

The training is structured around the student and is designed to be presented in various ways: short lectures, exercises, class discussions, and group work culminating in a completed prescribed fire plan.

II. COURSE OBJECTIVES

- Describe prescribed fire planning policies and guidelines.
- Identify and describe the processes involved in preparing a prescribed fire plan.
- Develop and defend a prescribed fire plan that safely meets management objectives.

III. INSTRUCTOR PREREQUISITES

Refer to the Field Manager's Course Guide (PMS 901-1) for instructor prerequisites specific to this course. The guide is online at <http://www.nwcg.gov/pms/training/fmcg.pdf>.

This is a 300 level course. In addition to the course specific instructor prerequisites, all instructors are required to have 32 hours of instructor training such as Facilitative Instructor (M-410), or an equivalent course, as stated in the Field Manager's Course Guide.

IV. COURSE COORDINATOR/INSTRUCTOR PREPARATION

A. General Information

While lead instructors are encouraged to enhance course material to reflect conditions, resources, and policies of the local unit, they must ensure that objectives of the course and each unit are not compromised.

Test questions may be added to reflect any local information that may have been added to the course. Instructors must spend adequate time preparing and agree on any changes before the class is presented.

The NWCG Course Coordinator's Guide (PMS 907) contains general information necessary for presentation of NWCG courses. The guide is online at <http://www.nwcg.gov/pms/training/PMS907.pdf>.

B. Local Agency Representatives

Representatives from local agencies may be brought in for Unit 1 to discuss how local/regional policy may vary from national policy. When discussing policy and guidelines, consider students with non-federal backgrounds; not all students may adhere to or understand federal policy. Discuss differences in federal and non-federal policy as appropriate.

C. Final Prescribed Fire Plan Evaluation (Final Project)

This is a cumulative project in which students work in groups to create a prescribed fire plan for presentation and evaluation—**advance planning and preparation is required.**

1. To conduct the final project, the cadre must choose one of the following prescribed fire plans:
 - North Pine Prescribed Fire Plan (located in Appendix D),

or
 - A more locally representative prescribed fire plan (materials will need to be created to support the new project). If a site visit is required, add additional time to the agenda.

The cadre must be thoroughly familiar with their chosen prescribed fire plan and prepare all necessary materials in advance.

2. At the end of each day's instruction, groups will complete their prescribed fire plan with the elements taught that day.
 - For example, at the end of instruction on day one, groups will complete the objectives, description of the prescribed fire area, and preliminary complexity analysis for their assigned project.
 - On the final day of class, groups must be prepared to defend all the elements of their prescribed fire plan.

For detailed instructions on conducting the final project, refer to the "Final Prescribed Fire Plan Evaluation Instructions" in Appendix D.

V. COURSE MATERIALS

Refer to Appendix A for course ordering and support information.

A. Instructor Guide

The Instructor Guide is designed as a teaching aid to assist instructors in presenting the information. Each unit begins with a unit overview that outlines the lesson's approximate delivery time, objectives, learning strategy, instructional methods, required materials, and evaluation criteria.

The lesson plan for each unit is organized in a two-column format:

- The “Outline” column contains the lesson content that supports the learning objectives. This column also includes questions to ask students, descriptions of exercises, and additional teaching points to supplement information in the text. Notes to the instructor are in **BOLD CAPS**.
- The “Aids & Cues” column lists references (slide numbers, handouts, publications, etc.) that remind instructors to display or refer to specific materials.

B. Student Workbook

Student Workbooks should be ordered prior to the beginning of the course, one for each student.

C. Course Materials CD-ROM

The CD contains complete copies of the Instructor Guide, Student Workbook, and Appendixes in bookmarked files in portable document format (pdf).

D. Student Reference Materials CD-ROM

The CD contains references and materials students will refer to throughout the course. Order one CD for each student.

E. Agenda

An example course agenda is on pages 12–13; revise as appropriate. Consider removing timeframes from the agenda given to students.

VI. STUDENT TARGET GROUP

This course is suggested training for students who are involved in (or plan to be involved in) the preparation of prescribed fire plans.

VII. STUDENT PREREQUISITES

Refer to the Field Manager's Course Guide for course prerequisites.

VIII. STUDENT PRE-COURSE WORK

The pre-course materials are located in Appendix C and online at <http://training.nwcg.gov/pre-courses.html>.

The course coordinator can either send the pre-course work on a CD to nominees or refer nominees to the Web site. Students should receive pre-course work information at least six weeks prior to beginning the course.

The course coordinator must send each nominee a letter that includes information and instructions for completing the pre-course work (see sample on page 9). The letter should also inform nominees that they must obtain a score of 70% or higher to attend the course.

NOTE: If sending the pre-course work on CDs, include a copy of the letter. Students will need to reference their Fireline Handbook, the Interagency Prescribed Fire Planning and Implementation Procedures and Reference Guide available at www.nifc.gov and The Prescribed Fire Complexity Rating Systems Guide available at www.nwcg.gov/pms. If referring nominees to the online version, list the Web site in the letter.

IX. COURSE ACCEPTANCE LETTER

Upon successfully passing the pre-course work, the course coordinator or lead instructor must send each student a course acceptance letter (see sample on page 11).

X. EVALUATING STUDENT PERFORMANCE

A. Daily Quizzes

A quiz is given at the end of each day of instruction and will account for 40% of students' final grade.

B. Final Prescribed Fire Plan Evaluation

The final project counts as 60% of students' cumulative score.

NOTE: For information on grading the quizzes and final project, refer to the "Grading" section on page 3 of the Final Prescribed Fire Plan Evaluation Instructions (Appendix D).

XI. CADRE MEETINGS

A cadre meeting is recommended prior to the beginning of course instruction.

XII. RECOMMENDED CLASS SIZE

Recommended class size is 20–30 students, with students divided into groups of 4–5.

A cadre member or coach must be provided for each student group. All cadre members and coaches should be present for all instructional sessions.

XIII. CLASSROOM REQUIREMENTS

The classroom should be chosen and viewed well in advance of the course presentation. Consider the following when choosing a location:

- Adequate room and flexibility for student work groups.
- Adequate desk space and power outlets for laptop computers (one powerstrip per table).
- Adequate access to copy and printing services.
- If printing in classroom, a laptop and driver for printer will be needed.

XIV. COURSE EVALUATION FORMS

Copies of the evaluation forms are in Appendix E.

A. Student Final Course Evaluation Form

This is an opportunity for students to comment on the course and the instructors for the purpose of improving future training sessions. Distribute this form at the beginning or end of the course.

B. Training Course Evaluation Form

This is an opportunity for the course coordinator and instructors to comment on course design. These comments are used by NWCG Training to identify potential problems with courses and as a resource during the course revision process.

XV. APPENDIXES

The following appendix is included in this Instructor Guide:

- Appendix A – Course Ordering and Support Information

The following appendixes are on the Course Materials CD-ROM:

- Appendix B – PowerPoints
- Appendix C – Pre-Course Work
- Appendix D – Student Assessment
- Appendix E – Course Evaluation Forms

Prescribed Fire Plan Preparation, RX-341
Pre-Course Work Letter to Nominee

To: ***“Nominee”***

From: Course Coordinator

Subject: Pre-Course Work

Please complete the pre-course work located “***on the enclosed CD***” or “***at the following Web site***”: <http://training.nwcg.gov/pre-courses.html>

Return your completed pre-course work to me by “***date.***” You must obtain a score of 70% or higher to attend the course. You will be contacted by “***date***” with information relative to your status for attending the course.

Please call me if you have any questions.

Course Administrator/Coordinator

Address

Telephone Number

Prescribed Fire Plan Preparation, RX-341
Course Acceptance Letter

To: ***“Student”***

Congratulations on successfully passing the pre-course work for Prescribed Fire Plan Preparation, RX-341. The pre-course work will be reviewed during class.

The course will be held ***“time, date, location.”*** Please do not make travel arrangements to arrive after the scheduled start time or to depart prior to the scheduled course completion time.

Bring the following to class:

- Interagency Prescribed Fire Planning and Implementation Procedures and Reference Guide
<http://training.nwcg.gov/pre-courses.html>
- Fireline Handbook (PMS 410-1)
<http://www.nwcg.gov/pms/pubs/large.html>
- Fireline Handbook - Appendix B (PMS 410-2)
<http://www.nwcg.gov/pms/pubs/large.html>
- Incident Response Pocket Guide (PMS 461)
<http://www.nwcg.gov/pms/pubs/pubs.htm>
- Laptop computer with BehavePlus (download BehavePlus at:
<http://www.fire.org/index.php?option=content&task=category§ionid=2&id=7&Itemid=26>)

Please call me if you have any questions.

Course Administrator/Coordinator
Address
Telephone Number

Prescribed Fire Plan Preparation, RX-341

Sample Agenda

Day 1

Unit 0:	Introduction.....	1 hour
Unit 1:	Policies and Guidelines.....	1 hour
Unit 2:	Goals and Objectives	1 hour
	<i>Lesson: 40 minutes</i>	
	<i>Exercise: 20 minutes</i>	
Unit 3:	Description of the Prescribed Fire Area.....	1 hour
Unit 4:	Complexity Analysis and Risk Assessment.....	2 hours
	<i>Lesson: 1 hour 30 minutes</i>	
	<i>Exercise: 30 minutes</i>	
Day 1 Quiz		30 minutes
Student work time		1 hour 30 minutes

Day 2

Day 1 Quiz Review		30 minutes
Unit 5:	Prescription Development and Scheduling.....	2 hours 30 minutes
	<i>Lesson: 1 hour 35 minutes</i>	
	<i>Exercise (Red Bull Prescription): 30 minutes</i>	
	<i>Exercise (Prescription Development): 25 minutes</i>	
Unit 6:	Smoke Management and Air Quality	1 hour
Unit 7A:	Pre-burn Considerations and Briefing	30 minutes
Unit 7B:	Organization and Equipment	30 minutes
Unit 7C:	Organization and Equipment	1 hour
	<i>Lesson: 45 minutes</i>	
	<i>Exercise: 15 minutes</i>	
Day 2 Quiz		30 minutes
Student work time		1 hour 30 minutes

Day 3

Day 2 Quiz Review	30 minutes
Unit 7D: Holding Plan	1 hour
Unit 7E: Contingency Plan and Wildfire Conversion	2 hours
<i>Lesson: 1 hour 45 minutes</i>	
<i>Exercise: 15 minutes</i>	
Unit 7F: Communication.....	15 minutes
Unit 7G: Public and Personnel Safety.....	15 minutes
Unit 8: Monitoring	1 hour
Unit 9: Funding, Post-Burn Activities and Appendices.....	30 minutes
Day 3 Quiz	30 minutes
Student work time	1 hour 30 minutes

Day 4

Day 3 Quiz Review	30 minutes
Unit 10: Final Complexity Analysis	1 hour 30 minutes
<i>Lesson: 30 minutes</i>	
<i>Exercise: 1 hour</i>	
Unit 11: Reviews, Approvals and Signature Page	30 minutes
Day 4 Quiz	30 minutes
Day 4 Quiz Review	30 minutes
Student work time	4 hours 30 minutes

Day 5

Final Project Evaluation.....	3 hours
Course evaluation\closeout	1 hour

*This schedule is designed to include the following (at instructors' discretion):

- Periodic (5 minute) breaks
- Lunch breaks (1 hour each day)

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 0 – Introduction

Time 1 Hour

Objectives

1. Introduce the cadre and students.
2. Discuss course logistics.
3. Explain the course objectives.
4. Identify course reference materials.
5. Explain student evaluation methods.
6. Discuss the final project.
7. Review the pre-course work.

Strategy

During this unit the instructor will discuss student and instructor expectations for the course, divide students into their assigned work groups, and establish the foundation for students' final prescribed fire plan.

Note: Before presenting this unit, the cadre should be thoroughly familiar with the instructions for conducting the final project. Refer to the “Final Prescribed Fire Plan Evaluation Instructions” in Appendix D (these instructions apply to both the locally produced Rx plan and the North Pine Rx plan).

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

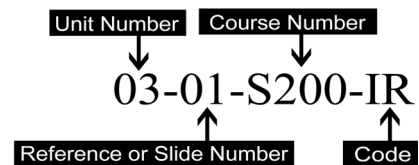
Outline

- I. Introductions
- II. Course Logistics
- III. Course Objectives
- IV. Course Reference Materials
- V. Evaluating Student Performance
- VI. Review Pre-Course Work

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 0 – Introduction

OUTLINE	AIDS & CUES
NWCG MISSION STATEMENT SLIDE.	0-1-RX341-PPT
WELCOME STUDENTS TO THE RX-341 COURSE.	0-2-RX341-PPT
I. INTRODUCTIONS	0-3-RX341-PPT
USE ANY METHOD DESIRED. HAVE STUDENTS INCLUDE THEIR BACKGROUND (RESOURCES, OPERATIONS, ETC.).	
II. COURSE LOGISTICS	0-4-RX341-PPT
<ul style="list-style-type: none">• Schedule of events/agenda• Punctuality, breaks• Facility locations (local eateries, vending machines, restrooms, etc.)• Message locations, telephone access, cell phone etiquette	

OUTLINE	AIDS & CUES
<p>EXERCISE: Student Expectations</p> <p><u>Time:</u> 10 minutes</p> <p><u>Format:</u> Small groups</p> <p><u>Instructions:</u></p> <ol style="list-style-type: none"> 1. Instruct students to create a list of expectations they have for the course (use flip charts). 2. Discuss these lists and save them for the final day to see if the course met student expectations. <p><u>End of Exercise.</u></p>	<p>0-5-RX-341-PPT</p>
<p>III. COURSE OBJECTIVES</p> <ul style="list-style-type: none"> • Describe prescribed fire planning policies and guidelines. • Identify and describe the processes involved in preparing a prescribed fire plan. • Develop and defend a prescribed fire plan that safely meets management objectives. 	<p>0-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>V. EVALUATING STUDENT PERFORMANCE</p> <p>Students' performance is evaluated by:</p> <p>A. Daily Quizzes</p> <ul style="list-style-type: none"> • A quiz is given at the end of each day of instruction (four total). • The quizzes account for 40% of students' final grade. <p>B. Final Prescribed Fire Plan Evaluation (Final Project)</p> <ul style="list-style-type: none"> • This is a cumulative project; students work in groups to create a prescribed fire plan for presentation and evaluation. • The final project counts as 60% of students' cumulative score for the course. <p>C. Overview of the Final Project Instructions and Criteria</p> <p>AT THIS TIME, THE INSTRUCTOR SHOULD:</p> <ol style="list-style-type: none"> 1. Divide students into their assigned groups; tell students they will stay in these groups until the final evaluation (students are put into new groups for the final evaluation). 2. Provide students with a general idea of how the final project is conducted by briefly reviewing the following: <p>Time is allotted at the end of each day for groups to complete the elements of the prescribed fire plan taught that day.</p>	<p>0-9-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>For example, at the end of instruction on day one, groups are given time to complete the objectives, description of the prescribed fire area, and preliminary complexity analysis for their assigned project.</p> <p>If additional time is needed, groups can work on their prescribed fire plans after scheduled course hours.</p> <p>To participate in the final evaluation, each student will need a clean, final copy of their group's prescribed fire plan. Students are then assigned to a final evaluation group consisting of at least one participant from each of the original work groups.</p> <p>Students must be prepared to defend all the elements of their prescribed fire plan; however, will only defend 4–5 elements. Graded elements are assigned by the cadre; students will not know which elements they are assigned until the day of the final evaluation.</p> <p>Each student will read and provide the rationale for their assigned elements from their final prescribed fire plan. The rationale is not limited to the assigned element; in many cases the elements are linked, and multiple elements must be used to support a decision or rationale.</p> <p>A cadre member will be assigned as a facilitator/evaluator to each final evaluation group and will complete a Final Prescribed Fire Plan Assessment Form for each member of the group.</p>	
<p>REFER STUDENTS TO THE ASSESSMENT FORM AND BRIEFLY REVIEW (SW pg. 0.6; IG pg. 0.9).</p> <p>Students in each of the final evaluation groups, who are not presenting, will act as peer evaluators.</p>	<p>0-1-RX341-IR/SR</p>

OUTLINE	AIDS & CUES
<p>Each peer evaluator is responsible for participating in the discussion of the element being presented and completing an assessment form for the presenter.</p> <p>This is a critical role in the evaluation process. It is important that peer evaluators provide comments to justify the given score.</p> <p>3. Tell students which fire plan is being used for the final project (either North Pine or a locally produced prescribed fire plan).</p> <p>4. If using North Pine for the final project:</p> <ul style="list-style-type: none"> • Tell students the materials are on their student CD. • Show slides 10-39 (overview of the North Pine prescribed fire). Note: If using a local project, these slides can be replaced with local photos. <p>5. Ask students if they have any questions; ensure they understand what is expected of them.</p> <p><u>End of Overview.</u></p>	<p>0-10-RX341-PPT thru 0-39-RX341-PPT</p>
<p>VI. REVIEW PRE-COURSE WORK</p> <p>ADDRESS ANY QUESTIONS, CONCERNS, OR COMMON ERRORS.</p>	<p>0-40-RX341-PPT</p>

Final Prescribed Fire Plan Assessment Form

Name of student being evaluated: _____

Scoring criteria for burn plan elements				
0	1	2	3	4
Student was not able to explain the assigned burn plan element, or element incomplete.	Burn plan element somewhat complete, but explanation inadequate.	Burn plan element adequate, but explanation insufficient to support the element.	Burn plan element adequate and well-covered, some details non-supporting to the element.	Burn plan element adequate and well-covered, supporting details specific to the element.

Element Ranking	Element	Evaluator Comments	Score
Easy Complexity	#1, 2, 10, 12, 21		
Low Complexity	#4, 6, 14, 19, 20, 8		
Medium Complexity	#5, 9, 11, 13, 18		
High Complexity	#3, 7, 15, 16, 17		
	Additional Element # _____		

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 1 – Policies and Guidelines

Time 1 Hour

Objectives

1. Identify the policies that direct prescribed fire planning.
2. Identify the responsibilities of the prescribed fire plan preparer, technical reviewer, and agency administrator as they relate to plan preparation.
3. Define the purpose of a prescribed fire plan.
4. Describe the processes involved in preparing the prescribed fire plan.

Strategy

This unit is an introduction to the policies and guidelines affecting prescribed fire plan preparation. It gives a brief overview of the planning process involved with creating a prescribed fire plan. The instructor should not go into too much detail in the overview.

If available, representatives from local agencies can discuss how local/regional policy may vary from national policy. When discussing policy and guidelines, consider students with non-federal backgrounds. Not all students may adhere to or understand federal policy. Discuss differences in federal and non-federal policy as appropriate.

Important: Ensure information regarding questions 1 and 2 of the Day 1 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Department of the Interior, DM Part 620 - Wildland Fire Management, Chapter 4: Fuels Management and Wildland-Urban Interface Community Assistance (Student Reference Materials CD)
- ☐ Department of Agriculture, FSM 5100 - Fire Management, Chapter 5140 - Fire Use (Student Reference Materials CD)

Optional Materials to Support the Unit

- ☐ State, regional, local government policies affecting prescribed fire (instructors provide)

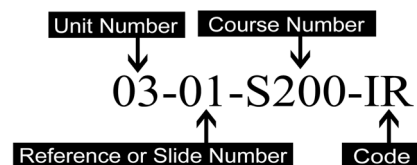
Outline

- I. Policies that Direct Prescribed Fire Planning
- II. Responsibilities
- III. The Purpose of a Prescribed Fire Plan
- IV. Prescribed Fire Planning Process

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 1 – Policies and Guidelines

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	1-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	1-2-RX341-PPT
I. POLICIES THAT DIRECT PRESCRIBED FIRE PLANNING	1-3-RX341-PPT
A. Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide “The Guide” describes the minimally acceptable components of prescribed fire planning and implementation. It provides unified direction and guidance for prescribed fire planning and implementation for federal agencies including: <ul style="list-style-type: none">• Bureau of Indian Affairs (BIA)• Bureau of Land Management (BLM)• National Park Service (NPS)• Fish and Wildlife Service (FWS)• United States Department of Agriculture Forest Service (USDA FS)	

OUTLINE	AIDS & CUES
<p>B. Department of the Interior, DM Part 620 - Wildland Fire Management, Chapter 4: Fuels Management and Wildland-Urban Interface Community Assistance</p> <p>C. Department of Agriculture, FSM 5100 - Fire Management, Chapter 5140: Fire Use</p> <p>D. Other Policy and Guidelines</p>	<p>1-4-RX341-PPT</p> <p>1-5-RX341-PPT</p> <p>1-6-RX341-PPT</p>
<p>INTRODUCE LOCAL/REGIONAL PRESCRIBED FIRE MANAGEMENT REPRESENTATIVE IF APPLICABLE.</p> <ul style="list-style-type: none"> • States • Regions • Local government • Non-government organizations • Wilderness criteria • Other compliance documents <ul style="list-style-type: none"> – National Environmental Policy Act (NEPA) – Endangered Species Act – Air quality – Historic preservation <p>ASK STUDENTS FOR EXAMPLES OF OTHER POLICIES AND GUIDELINES THAT REGULATE PRESCRIBED FIRE.</p>	

OUTLINE	AIDS & CUES
<p data-bbox="203 281 626 317">II. RESPONSIBILITIES</p> <p data-bbox="298 367 1092 489">The responsibilities section of “The Guide” lists all the responsibilities of the positions listed below (plus others not covered here).</p> <p data-bbox="298 537 834 573">A. Prescribed Fire Plan Preparer</p> <ul data-bbox="396 623 1105 1045" style="list-style-type: none"> <li data-bbox="396 623 987 659">• Prepares plans according to policy. <li data-bbox="396 709 1097 831">• Coordinates with resource management and technical specialists to ensure the plan meets resource objectives. <li data-bbox="396 882 1101 961">• Interacts with technical reviewer to ensure all plan elements are adequately addressed. <li data-bbox="396 1012 1084 1045">• Completes and signs complexity analysis. <p data-bbox="298 1094 695 1129">B. Technical Reviewer</p> <ul data-bbox="396 1180 1109 1812" style="list-style-type: none"> <li data-bbox="396 1180 948 1215">• Ensures that plans meet policies. <li data-bbox="396 1266 1105 1346">• Ensures the complexity analysis accurately reflects the project(s). <li data-bbox="396 1396 1078 1476">• Ensures prescription parameters meet the resource and control objectives. <li data-bbox="396 1526 1101 1648">• Ensures ignition, holding, and contingency plans are consistent with the predicted fire behavior. <li data-bbox="396 1698 1109 1812">• Completes and signs the Technical Review Checklist Plan and the Prescribed Fire Plan signature page. 	<p data-bbox="1141 537 1386 573">1-7-RX341-PPT</p> <p data-bbox="1141 1094 1386 1129">1-8-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Agency Administrator</p> <ul style="list-style-type: none"> • Approves prescribed fire plans. • Understands and approves, by signature, the complexity analysis and assigned rating. • Determines if and when agency administrator is to be notified that contingency actions are being taken. • Ensures the prescribed fires that receive a National Ambient Air Quality Standards Notice of Violation are reviewed according to established guidelines. 	<p>1-9-RX341-PPT</p>
<p>III. THE PURPOSE OF A PRESCRIBED FIRE PLAN</p> <p>ASK STUDENTS:</p> <p>Does every management ignited fire need a prescribed fire plan? Yes</p> <p>Are there instances when a prescribed fire plan could be developed other than for prescribed fires?</p> <p>Yes; for example, incident management teams have started writing portions of prescribed fire plans or firing plans for large scale burnout (backfiring) operations (not blacklining operations).</p>	
	<p>1-10-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>The prescribed fire plan is a site-specific implementation document that describes how project objectives are met.</p> <p>It is a legal document that provides the prescribed fire burn boss with information needed to implement the prescribed fire.</p>	1-11-RX341-PPT
<p>A. Minimum Elements Required in a Prescribed Fire Plan</p> <ol style="list-style-type: none"> 1. Signature page 2. Go/No-Go Checklists 3. Complexity analysis 4. Description of the prescribed fire area 5. Objectives 6. Funding 7. Prescription (RX) 8. Scheduling 9. Pre-burn considerations 10. Briefing 11. Organization and equipment 12. Communication 	1-12-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> 13. Public and personnel safety 14. Test fire 15. Ignition plan 16. Holding plan 17. Contingency plan 18. Wildfire conversion 19. Smoke management and air quality 20. Monitoring 21. Post-burn activities 	1-13-RX341-PPT
<ul style="list-style-type: none"> B. Required Appendices <ul style="list-style-type: none"> 1. Complexity analysis 2. Maps 3. Technical review checklist 4. Fire behavior modeling documentation or empirical documentation (unless it is included in the fire behavior narrative in Element 7 - Prescription). 5. Job Hazard Analysis (JHA) or other agency-specific risk analysis. 	1-14-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="203 281 985 317">IV. PRESCRIBED FIRE PLANNING PROCESS</p> <p data-bbox="203 367 1036 489">THIS INFORMATION IS INTENDED AS AN <u>OVERVIEW</u> ONLY; IT IS COVERED IN DETAIL IN SUBSEQUENT UNITS.</p> <p data-bbox="298 537 1088 619">For a prescribed fire to be implemented successfully, a good prescribed fire plan is needed.</p> <p data-bbox="298 665 505 703">A. Timing</p> <ul data-bbox="396 751 1102 1472" style="list-style-type: none"> • Begin the planning process in advance by thinking operationally in a stress-free environment. • Consider a range of possibilities to prepare a flexible document that can be implemented. <ul data-bbox="461 1094 974 1297" style="list-style-type: none"> – Resource objectives – Safety considerations – Personnel and logistics needs – Anticipated fire behavior – Others • Allow time for the technical review and approval process to be completed well in advance of implementation. <p data-bbox="203 1520 982 1642">DISCUSS TYPICAL TIMELINES YOU HAVE EXPERIENCED IN PRESCRIBED FIRE PLAN PREPARATION.</p> <ul data-bbox="396 1690 1079 1856" style="list-style-type: none"> • The prescribed fire plan template from “The Guide” must be used. Each element must be addressed and then assembled in the sequence identified in the template. 	<p data-bbox="1141 281 1406 317">1-15-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • When interagency mixed ownership prescribed fire plans are being prepared, all appropriate elements are developed in an interagency setting. • For cooperative prescribed fires implemented by non-federal entities involving federal and non-federal lands (where only a small amount of federal lands are treated), the local agency administrator has discretion to use either a federal or non-federal prescribed fire plan. <p>B. Plan Preparation Sequence</p> <p>The sequence of the planning process may vary by individual preference and often by project needs.</p> <ol style="list-style-type: none"> 1. Objectives <ul style="list-style-type: none"> • Strategic and Landscape Plan(s) • Departmental Policy and Direction • NEPA documents supporting these items • Research for specific resource objectives 2. Project assessment and design <ul style="list-style-type: none"> • Project boundaries and layout • Site and project descriptors 	<p>1-16-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>3. Preliminary complexity analysis</p> <p>The preliminary analysis is used to prepare or revise the prescribed fire plan to mitigate or remove higher complexity issues.</p> <p>4. Prescription elements</p> <ul style="list-style-type: none"> • Environmental parameters • Fire behavior parameters <p>5. Implementation</p> <ul style="list-style-type: none"> • Pre-burn considerations • Briefing • Organizational and equipment • Communication • Public and personnel safety • Test fire • Ignition plan • Holding plan • Contingency plan • Wildfire conversion • Smoke management and air quality plan 	

OUTLINE	AIDS & CUES
<p>6. Final complexity analysis</p> <p>Finalize and approve (based on mitigation measures and actions taken throughout the plan, and completed before, during, and after prescribed fire implementation).</p> <p>7. Monitoring and post-burn activities</p> <ul style="list-style-type: none"> • Rehabilitation needs • Fire effects monitoring • Identify reports needed <p>8. Technical review</p> <ul style="list-style-type: none"> • This is a required step in plan development. <ul style="list-style-type: none"> – If the technical review is returned with a “Yes,” move on to next step. – If the technical review is returned with a “No,” fix identified problems. • The technical reviewer must be someone other than the primary preparer of the plan. <ul style="list-style-type: none"> – Other specialists may review portions of the plan. – A primary technical reviewer must be designated as the review signatory. 	

OUTLINE	AIDS & CUES
<p data-bbox="396 281 649 321">9. Signatures</p> <p data-bbox="490 367 1071 449">At a minimum, the prescribed fire plan must be signed by:</p> <ul data-bbox="490 495 987 615" style="list-style-type: none"> <li data-bbox="490 495 987 535">• Prescribed fire plan preparer <li data-bbox="490 579 846 615">• Technical reviewer <p data-bbox="553 663 1089 833">Either the prescribed fire plan preparer or technical reviewer must be currently qualified, <i>less physical fitness requirements</i>.</p> <p data-bbox="558 879 1105 1085">This allows qualified people who may be injured or temporarily unable to pass the physical fitness requirements to perform as technical reviewer.</p> <ul data-bbox="490 1131 894 1171" style="list-style-type: none"> <li data-bbox="490 1131 894 1171">• Agency Administrator <p data-bbox="203 1220 1079 1341">REFER TO AND DISCUSS THE SIGNATURE PAGE OF THE PRESCRIBED FIRE PLAN TEMPLATE LOCATED IN APPENDIX B OF “THE GUIDE.”</p> <p data-bbox="203 1434 716 1470">REVIEW UNIT OBJECTIVES.</p>	<p data-bbox="1141 1434 1406 1470">1-17-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 2 – Goals and Objectives

Time 1 Hour

Objectives

1. Define land management goals and project objectives.
2. Develop S.M.A.R.T. (Specific, Measurable, Achievable, Relevant, Time Bound) objectives to meet project goals.
3. Describe how the prescribed fire plan relates to fire management plans and land management plan goals.
4. Identify information sources used to develop project objectives.

Strategy

This unit provides students with an introduction to objectives found in prescribed fire plans. Students gain an understanding of sources as well as the ability to evaluate land management goals and project objectives.

Important: Ensure information regarding questions 3 and 4 of the Day 1 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

Optional Materials to Support the Unit

The instructor may provide one or more of the following documents as example sources of goals and objectives for prescribed fire plans:

- ☐ Land Management Plan
- ☐ LANDFIRE
- ☐ Community Wildfire Protection Plan
- ☐ Land Use Plan
- ☐ NEPA
- ☐ Threatened and Endangered Species Documentation
- ☐ Wilderness Plan

Exercise

- Evaluating Goals and Objectives (pages 2.9 – 2.10)

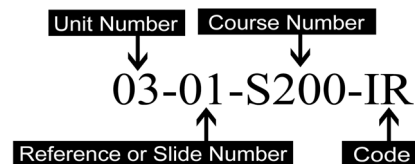
Outline

- I. Define Land Management Goals and Project Objectives
- II. Developing S.M.A.R.T. Objectives
- III. Relating the Prescribed Fire Plan to Fire Management Plan and Land Management Plan Goals
- IV. Information Sources Used to Develop Project Objectives

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 2 – Goals and Objectives

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	2-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	2-2-RX341-PPT
I. DEFINE LAND MANAGEMENT GOALS AND PROJECT OBJECTIVES Land management goals are the foundation for all land management actions and project objectives. Without goals and project objectives there is no direction and no measure of success. You won't know where you are going and you won't know when you are there.	2-3-RX341-PPT
A. Goals A goal is a general summary of what land management actions are working to achieve; the end result defines success. Goals are primary and basic products of long-range management plans.	2-4-RX341-PPT
1. Goal statements should be: <ul style="list-style-type: none">• Visionary• Relatively general• Brief• Measurable	2-5-RX341-PPT

OUTLINE	AIDS & CUES
<p>2. Example goal statements:</p> <p>DISCUSS THE EXAMPLE GOALS AND HAVE STUDENTS MAKE SUGGESTIONS FOR IMPROVEMENT AS NECESSARY.</p> <ul style="list-style-type: none"> • Move 90% of the foothills landscape from a fire regime condition class 3 to a condition class 2 within 10 years. • Reduce the potential for catastrophic wildfire in the wildland urban interface through fuel reduction projects along forest boundaries. • Restore and maintain sufficient foraging and nesting habitat for red-cockaded woodpeckers (as stated in the endangered species recovery plan). 	<p>2-6-RX341-PPT</p>
<p>B. Objectives</p> <p>Objectives are well-defined statements that describe what a treatment must accomplish to meet or contribute to achieving a goal.</p> <p>Set objectives early in the process. Failure to do so misdirects planning efforts and wastes time.</p>	<p>2-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>II. DEVELOPING S.M.A.R.T. OBJECTIVES</p> <p>Project objectives include resource and prescribed fire objectives. They are site and treatment specific, must use the S.M.A.R.T. concept, and are a description of the desired end condition of an action.</p> <p>A. S.M.A.R.T.</p> <p>GIVE EXAMPLE OBJECTIVES RELATING TO EACH LETTER OF THE S.M.A.R.T. ACRONYM BASED ON INSTRUCTOR’S EXPERIENCE.</p> <ol style="list-style-type: none"> 1. Specific: Relate objectives to particular desired outcomes of the prescribed fire. <ul style="list-style-type: none"> • Must define what you want to accomplish. • Good data is essential. 2. Measurable: Be clear and concise with measurable results. <ul style="list-style-type: none"> • Unambiguous – no question about what is being measured. • Concise – focuses the effort; useful in communication with others. • Provides a yardstick for evaluating progress. • A well-designed monitoring effort tells you if you are successful. 3. Achievable: If you cannot meet your objective you will fail. 	<p>2-8-RX341-PPT</p> <p>2-9-RX341-PPT</p> <p>2-10-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>4. Related or relevant: Sets realistic (useful and affordable) boundaries for management.</p> <ul style="list-style-type: none"> • Defines geographic and temporal scope of action. • Focuses your effort on what exactly you want to accomplish. <p>5. Time-bound or time-related: Objectives must be set in a timeframe.</p> <ul style="list-style-type: none"> • Manage smoke through the duration of the burn, or • Consume 10-hour fuels as measured within one year. <p>6. Example objectives:</p>	
<p>EVALUATE THE EXAMPLE OBJECTIVES USING THE SMART CRITERIA.</p> <ul style="list-style-type: none"> • Reduce 10-hour fuel loading in burn unit by 50% as measured within one year post-burn. • Retain 1-mile visibility along Route 46 during all phases of the prescribed fire. • Limit average crown scorch of overstory pines to 30%, as measured within 5 days of burn completion. 	2-11-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="285 281 1013 321">B. Potential Difficulties in Setting Objectives</p> <ol style="list-style-type: none"> <li data-bbox="383 365 1114 747">1. Data <ul style="list-style-type: none"> <li data-bbox="477 453 1000 575">• Unavailable information often leads to poor objectives and implementation. <li data-bbox="477 621 1097 747">• Background/historical information is important and may influence future objective development. <li data-bbox="383 793 1078 1083">2. Resource management conflicts often exist: <ul style="list-style-type: none"> <li data-bbox="477 919 721 959">• Silviculture <li data-bbox="477 963 883 1003">• Cultural/historical site <li data-bbox="477 1008 1078 1050">• Threatened and endangered species <li data-bbox="477 1054 721 1094">• Wilderness <li data-bbox="383 1140 1114 1686">3. Resolving conflicting objectives: <ul style="list-style-type: none"> <li data-bbox="477 1224 1078 1346">• Plans cannot be implemented when meeting one objective would cause failure to meet another objective. <li data-bbox="477 1392 1114 1472">• Ranking could help resolve objective priorities and help eliminate conflicts. <li data-bbox="477 1518 1114 1686">• Forces decisionmakers to critically examine and make a determination as to which objectives are most important. <p data-bbox="188 1732 1094 1812">DISCUSS POSSIBLE MITIGATION MEASURES FOR CONFLICTING OBJECTIVES.</p>	<p data-bbox="1146 281 1419 321">2-12-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>III. RELATING THE PRESCRIBED FIRE PLAN TO FIRE MANAGEMENT PLANS AND LAND MANAGEMENT PLAN GOALS</p> <p>Prescribed fire is one component of management that supports the accomplishment of resource goals. The prescribed fire plan is the site specific implementation document.</p> <p>Project objectives are what you are going to get done on the burn that are SMART and contribute to the accomplishment of the land management goals.</p>	2-13-RX341-PPT
<p>IV. INFORMATION SOURCES USED TO DEVELOP PROJECT OBJECTIVES</p> <p>A. Land Management Goals</p> <ul style="list-style-type: none"> • Land management plans (fire, forestry, range, wildlife, etc.) • Community wildfire protection plans • NEPA (environmental assessments, environmental impact statements, categorical exclusion and accompanying decision record) • Threatened and endangered species recovery plans • Wilderness plans • Fire regime condition class maps (LANDFIRE) • Others? 	2-14-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="284 281 654 321">B. Project Objectives</p> <p data-bbox="380 365 1057 491">Planners are often responsible for developing objectives, usually through working with interdisciplinary teams.</p> <p data-bbox="380 535 1065 619">Good data and group consensus is essential to developing useful and achievable objectives.</p> <p data-bbox="380 663 1057 703">Sources of information for project objectives:</p> <ul data-bbox="380 747 1097 873" style="list-style-type: none"> • Previous successful prescribed fire projects • Project specific NEPA • Developed through resource specialists <p data-bbox="188 961 940 1001">EXERCISE: Evaluating Goals and Objectives.</p> <p data-bbox="188 1045 1010 1129"><u>Objective:</u> Students evaluate prescribed fire objectives according to the SMART criteria.</p> <p data-bbox="188 1173 1089 1257"><u>Time:</u> 10 minutes for group work time, 10 minutes for class discussion time.</p> <p data-bbox="188 1302 521 1341"><u>Format:</u> Work groups</p> <p data-bbox="188 1386 1105 1554"><u>Instructions:</u> Refer students to the exercise on page 2.8 in their Student Workbook. Instruct groups to evaluate the goals or objectives, and rewrite any objectives that do not meet the SMART criteria. Discuss answers when finished.</p> <ol data-bbox="188 1598 826 1638" style="list-style-type: none"> 1. Enhance pileated woodpecker habitat. <p data-bbox="261 1682 1002 1722">What would make this goal become an objective?</p> <ol data-bbox="188 1766 894 1806" style="list-style-type: none"> 2. Given average tree stand height of 70 feet: 	<p data-bbox="1144 663 1414 703">2-15-RX341-PPT</p> <p data-bbox="1144 961 1414 1001">2-16-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> a. Limit scorch height to 50 feet within seven days after burn. b. Limit mortality of 30-foot understory trees to 60% within seven days after burn. <p>3. Reduce fuel loading of 1- and 10-hour woody fuels by a minimum 75% over 90% of the area immediately post-burn.</p> <p><u>End of Exercise.</u></p> <p>REVIEW UNIT OBJECTIVES.</p>	<p>2-17-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 3 – Description of the Prescribed Fire Area

Time 1 Hour

Objectives

1. Identify information required to accurately describe the prescribed fire area.
2. Define the concept of project boundary as it relates to landscape prescribed fire planning.
3. Identify the mapping requirements and standards for a prescribed fire plan.

Strategy

This unit provides students with knowledge to complete Element 4, description of the prescribed fire area. It also covers mapping requirements and standards, and the concept of project boundary.

On completion of the unit, instructors should tie each prescribed fire plan element(s) to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 5 and 6 of the Day 1 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ The instructor may provide examples of maps used as part of a prescribed fire plan.

Print one copy of the following for each student:

- ☐ Red Bull Rx Fire Plan_Student.pdf (on the course materials CD in the Red Bull Prescribed Fire Plan Instructor Materials folder). Do not use the Red Bull Plan on the student CD—it contains the answers.

Note: The Red Bull RX Plan is intended as a teaching tool. It is based on an actual plan periodically implemented by the BIA. Students and instructors are encouraged to debate various parts of the plan and techniques used.

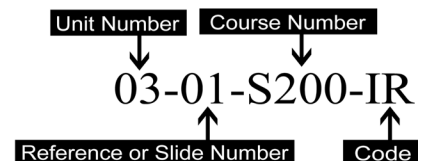
Outline

- I. Describing the Burn Unit
- II. Project Boundary
- III. Mapping Requirements and Standards

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 3 – Description of the Prescribed Fire Area

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	3-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	3-2-RX341-PPT
I. DESCRIBING THE BURN UNIT	3-3-RX341-PPT
A. Physical Description	
1. Location	
The narrative description of the prescribed fire project location includes:	
• Legal description	
• Universal Transverse Mercator (UTM)	
• Latitude/longitude (decimal degrees, map datum, county, and state)	
The narrative description provides a general written description to enable you and your team to travel to the project.	
It allows contingency and emergency resources to locate your fire.	

OUTLINE	AIDS & CUES
<p>2. Format is critical (legal, UTM, or latitude/longitude and datum)</p> <ul style="list-style-type: none"> • It must be in the format that aerial and ground resources use on their equipment; otherwise it is of no use to them. • Format is also important for reporting requirements. <p>3. Size</p> <p>Area of the prescribed fire project with a breakdown by ownership if applicable.</p> <ul style="list-style-type: none"> • Area allows your fire projects to be tracked. • Gives assigned personnel an idea of how large the project will be. <p>4. Topography</p> <p>DISCUSS THE IMPORTANCE AND THE REASONS TO INCLUDE TOPOGRAPHICAL DESCRIPTORS.</p> <p>Identify the upper and lower range of:</p> <ul style="list-style-type: none"> • Elevation • Slope(s) <ul style="list-style-type: none"> – Maximum/minimum – Average 	

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Aspect(s) <p>Examples of aspect topography could include:</p> <ul style="list-style-type: none"> – Drainages that affect fire/smoke behavior and represent operations challenges. – Creeks or rivers that are barriers or water sources for fire spread and travel. – Others? 	
<p>B. Vegetation/Fuels Description</p> <p>This is a description of current vegetation and fuels in and adjacent to the project area.</p> <ul style="list-style-type: none"> • Structure and composition of the vegetation type(s). • Natural or activity fuels, total fuel load (both live and dead) in tons/acre. • Dead fuel load by timelag size classes. • Live fuel load (woody/herbaceous). • Fuel bed depth, and vertical and horizontal arrangement. • Percent of the unit composed of each vegetative type and the corresponding fuel model(s). 	<p>3-4-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> Identify conditions (fuels, slope, and aspect) in or adjacent to boundaries that may be a potential threat for escaped fire. <p>C. Description of Unique Features and Resources</p> <ul style="list-style-type: none"> Fences/power lines Historical/cultural sites Threatened and endangered species or habitat. Improvements or features that need to be protected. Others? 	3-5-RX341-PPT
<p>II. PROJECT BOUNDARY</p> <p>The project boundary defines that area where fire is ignited and may be allowed to burn.</p> <ul style="list-style-type: none"> Describe the physical, natural, or human-made boundaries (including multiple units) of the prescribed fire project. This is done through maps and may include narratives. The entire prescribed fire project area must be analyzed under NEPA, where applicable. <p>CLASS DISCUSSION: Provide students with a copy of the Red Bull Prescribed Fire Plan. Discuss Element 4, Sections A – D.</p>	3-6-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="285 281 773 321">B. Project Map(s) (Required)</p> <p data-bbox="380 367 1114 491">Project maps identify features in sufficient detail to guide and assist in operational implementation of the prescribed fire.</p> <p data-bbox="380 537 1065 619">Topographic, vegetative, or aerial photo maps should be used as the base map.</p> <p data-bbox="380 665 1065 789">Incident Command System (ICS) map display symbols, identified in the Fireline Handbook, should be used as appropriate.</p> <p data-bbox="380 835 808 875">1. Types of project maps</p> <p data-bbox="474 921 1101 1003">Project maps can vary by project and may not include all the elements listed below.</p> <ul data-bbox="474 1050 1003 1430" style="list-style-type: none"> • Project boundary • Proposed ignition sequence • Smoke management/trajectory • Transportation • Emergency/evacuation • Aviation • Contingency • Aerial photos • Areas of special concern <p data-bbox="188 1476 1016 1600">ASK STUDENTS WHAT FEATURES SHOULD BE INCLUDED ON PROJECT MAPS. REFER TO PAGES 20-21 OF “THE GUIDE.”</p>	<p data-bbox="1170 281 1417 321">3-9-RX341-PPT</p> <p data-bbox="1170 835 1406 875">3-10-S341-PPT</p>

OUTLINE	AIDS & CUES
<p>2. Key features include:</p> <ul style="list-style-type: none"> • Burn unit boundaries. • Constructed line (dozer, hand, blackline, wetline). • Natural barriers (rock slides, riparian, aspen stands). • Fuel model locations inside and outside burn unit(s). • Critical holding points, hazards, safety zones, escape routes. • Helispots, water sources, staging areas. • Areas of special concern and sensitive smoke receptor areas. • Contingency control lines. • Wilderness boundary. 	3-11-RX341-PPT
<p>C. Other Map Possibilities</p> <ol style="list-style-type: none"> 1. Three-dimensional modeling. 2. Color digital orthophoto quarter quads (if taken in winter, these are helpful in determining overstory vegetation composition). 3. Smoke modeling and dispersion (V-smoke, etc.). 	3-12-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> 4. Three-dimensional flyover-type maps; digital elevation models. 5. GPS waypoints of important features. 6. FARSITE potential fire growth simulation. 	
<p>REVIEW UNIT OBJECTIVES.</p>	<p>3-13-RX341-PPT</p>

UNIT OVERVIEW

Course	Prescribed Fire Plan Preparation, RX-341
Unit	4 – Risk Assessment and Preliminary Complexity Analysis
Time	2 Hours

Objectives

1. Define the risk management process and describe how it relates to the complexity analysis.
2. From the NWCG Prescribed Fire Complexity Rating System Guide:
 - a. Identify the three factors of the complexity analysis.
 - b. Identify the 14 elements that apply to the three risk factors of the complexity analysis.
 - c. Describe how mitigation measures may change the rating of complexity element(s).

Strategy

This unit discusses and defines the risk management process to help students relate the process to the prescribed fire complexity analysis. Students will complete a preliminary complexity analysis; the final complexity analysis is completed in Unit 10.

On completion of the unit, instructors should emphasize the relationship between each prescribed fire plan element(s) and the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 7, 8, 9, and 10 of the Day 1 Quiz are thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan (students will use their printed copy)
- ☐ NWCG Prescribed Fire Complexity Rating System Guide (student CD)
- ☐ The instructor may provide examples of completed preliminary complexity analysis.

Exercise

- Preliminary Complexity Analysis (pages 4.13 – 4.14)

Evaluation Method

- Day 1 Quiz (make one copy per student; located in Appendix D).

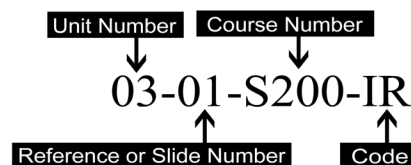
Outline

- I. Define the Risk Management Process and How it Relates to Complexity Analysis
- II. Prescribed Fire Complexity Rating System Guide

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 4 – Risk Assessment and Preliminary Complexity Analysis

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	4-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	4-2-RX341-PPT
I. DEFINE THE RISK MANAGEMENT PROCESS AND HOW IT RELATES TO COMPLEXITY ANALYSIS Risk management is a foundation for all prescribed fire activities. Risks and uncertainties relating to prescribed fire activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. The NWCG Prescribed Fire Complexity Rating System Guide defines risk as the probability or likelihood that an adverse event or situation will occur (for example, escaped fire).	4-3-RX341-PPT
A. Risk Discussion Points 1. Risk assessment is a valuable tool in prescribed fire planning. Some agencies may require additional risk assessment beyond the complexity analysis. 2. The purpose of the risk assessment is to provide critical information to the prescribed fire plan preparer, the burn boss, and the approving official on risks and consequences.	4-4-RX341-PPT

OUTLINE	AIDS & CUES
<p>3. The risk assessment process should start with the first site visit to the project area and should be completed early in the planning process.</p> <p>4. Risk assessments are not required for prescribed fire plans, but are good situational tools for high risk project planning and implementation.</p>	
<p>CLASS REVIEW:</p> <p>Refer students to the following risk assessment examples:</p> <ul style="list-style-type: none"> • Prescribed Fire Implementation Risk Assessment (SW pg. 4.11; IG pg. 4.15) • Escape-Risk Assessment (SW pg. 4.12; IG pg. 4.16) <p>Ensure students understand these are only examples of the many types of risk assessments that may be used.</p> <p><u>End of Review.</u></p>	<p>4-5-RX341-PPT</p> <p>4-1-RX341-IR/SR</p>

OUTLINE	AIDS & CUES
<p>B. Identifying and Assessing Risk</p> <ol style="list-style-type: none"> 1. Gather as much intelligence concerning the project and the area as you can. 2. Use the information to determine what could go wrong and what actions you might take to mitigate identified risks. 3. Learn from: <ul style="list-style-type: none"> • Your own and other's past experiences • Escaped fire reviews • After Action Reviews • Examples from the Wildland Fire Lessons Learned Center Web site: www.wildfirelessons.net 	<p>4-6-RX341-PPT</p>
<p>C. Risk Taking and Decisionmaking</p> <p>Someone who has been successful in the past and has a good process for gathering and interpreting information, is often more willing to take a risk, all other things being equal.</p> <p>Someone who has been unsuccessful, had a bad outcome in the recent past, or does not have a good process for gathering and interpreting information, is generally less willing to take a risk.</p> <p>These considerations can affect how willing an approving official and other relevant people, groups, and organizations are to accept the same risks.</p>	<p>4-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>D. Comparing Risk Assessment and Complexity Analysis</p> <ol style="list-style-type: none"> 1. Risk assessment is not the same as complexity analysis. 2. The risk assessment provides information needed in several elements of the complexity analysis. 3. There is duplication between elements of the risk assessment process and the complexity analysis process. 	4-8-RX341-PPT
<p>E. Steps to Integrate Risk and the Complexity Analysis into the Prescribed Fire</p> <ol style="list-style-type: none"> 1. Gather intelligence and identify the points of concern. <ul style="list-style-type: none"> • Fire behavior inside and outside the burn unit. • Potential consequences if an escaped fire occurs. • Smoke impacts • Safety hazards • Others? 2. Complete a risk assessment (check agency specific requirements). 3. Complete preliminary complexity analysis. 	4-9-RX341-PPT

OUTLINE	AIDS & CUES
<ol style="list-style-type: none"> 4. Develop the other components (elements) of the prescribed fire (organization, prescription, ignition, holding and contingency, personnel and public safety, etc.). 5. Reevaluate and finalize complexity analysis to ensure accuracy. 	
<p>II. PRESCRIBED FIRE COMPLEXITY RATING SYSTEM GUIDE</p>	<p>4-10-RX341-PPT</p>
<p>A. Purpose</p> <p>The purpose of the complexity rating process is to provide:</p> <ul style="list-style-type: none"> • Assignment of a complexity rating of high, moderate, or low to the prescribed fire. • Management and implementation personnel a relative ranking as to the overall complexity of a specific prescribed fire project. • A process that can be used to identify prescribed fire plan elements or characteristics that may pose special problems or concerns. • A process that identifies mitigation activities needed to reduce the risk/hazard to the implementation personnel and public as well as mitigating potential resource damage. 	<p>4-11-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Multiple Complexity Analyses</p> <p>Separate prescriptions and/or burn organizations for different stages of implementation may result in multiple complexity analyses and ratings.</p> <p>Examples:</p> <ul style="list-style-type: none"> Planned multi-stage prescribed fires with multiple organizations. Different prescriptions/seasons/fuel conditions. <p>D. Instructions/Process</p>	<p>4-14-RX341-PPT</p>
<p>REFER STUDENTS TO PAGE 3 OF THE COMPLEXITY GUIDE (ON THE STUDENT CD) AND FOLLOW THE INSTRUCTIONS.</p>	
<p>1. Step #1 – Preliminary Review of the Element Descriptors</p> <ul style="list-style-type: none"> A review of the rating descriptors prior to visiting the site will help identify the elements of most concern. Alternatives and/or mitigation measures that will help reduce the final complexity rating should be considered early in the planning process. Any risk analysis that was completed for the project can be reviewed and findings inserted into the complexity process at this time. 	<p>4-15-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="380 281 911 359">2. Step #2 – Preliminary Rating Determination</p> <ul style="list-style-type: none"> <li data-bbox="477 411 1040 533">• The preliminary rating should be completed prior to or early in the development of the plan. <ul style="list-style-type: none"> <li data-bbox="548 579 1122 701">– The problem areas identified may be mitigated during the planning process. <li data-bbox="477 747 1097 831">• The initial determination is often not as thorough as the final one. <ul style="list-style-type: none"> <li data-bbox="548 877 1097 1041">– During the initial site visit, look for trouble spots and areas of special concern, both inside and outside the project boundary. <li data-bbox="548 1087 1114 1251">– Consider the prescription needed to successfully light and hold the unit while meeting the burn objectives. <li data-bbox="477 1297 1122 1419">• Rate the preliminary value for each factor of each element by selecting the most appropriate descriptor. <ul style="list-style-type: none"> <li data-bbox="548 1465 1114 1629">– Circle the low, moderate, or high value on the worksheet and document the rationale for that value. <li data-bbox="548 1675 1097 1839">– If mitigation is needed and opportunities exist, briefly identify them in the preliminary rationale. 	<p data-bbox="1157 281 1422 317">4-16-RX341-PPT</p> <p data-bbox="1157 1087 1422 1123">4-17-RX341-PPT</p>

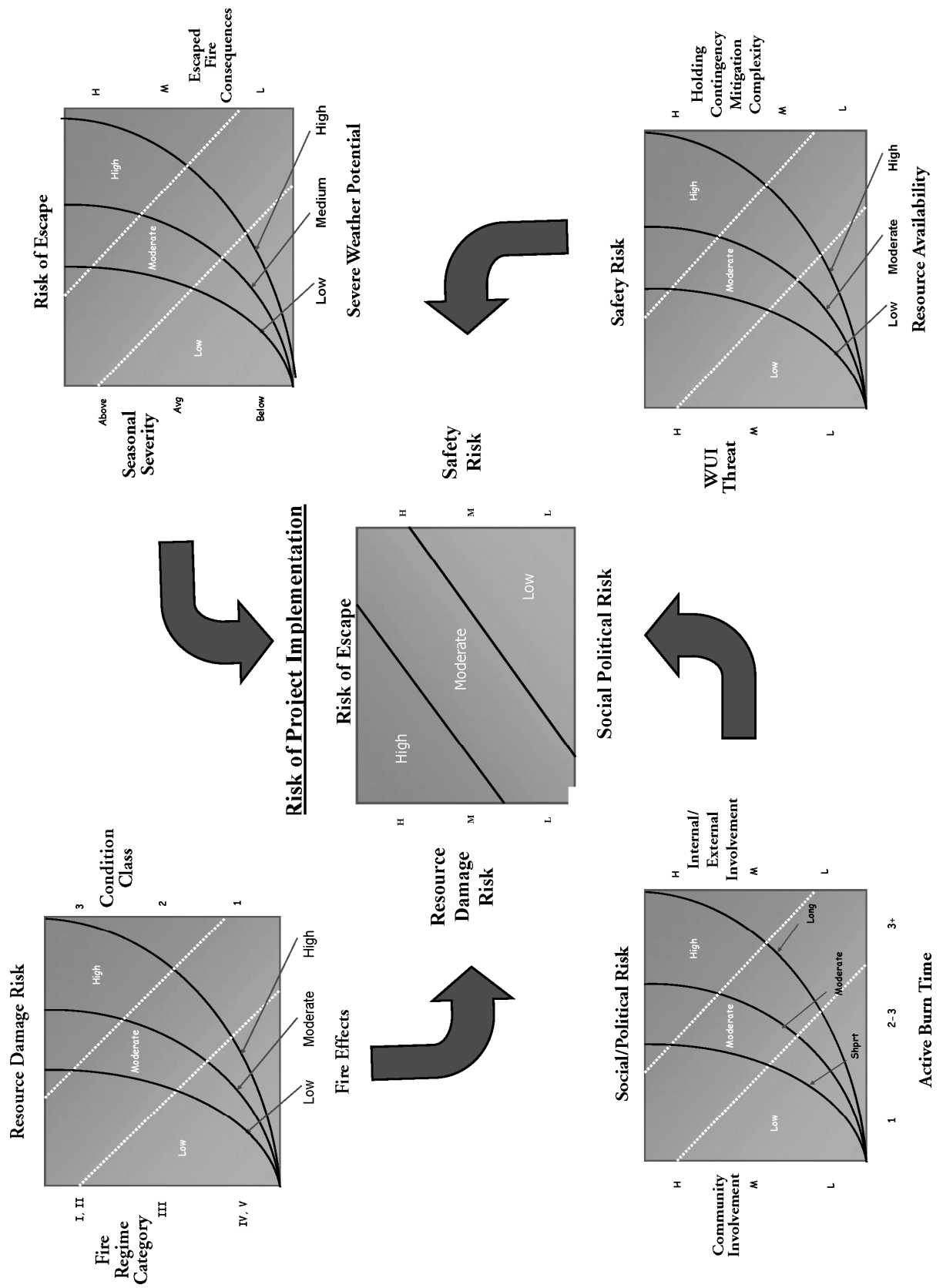
OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Mitigation opportunities should be developed during planning process. <p>CRITICAL TO STRESS THE FOLLOWING:</p> <ul style="list-style-type: none"> – This is the point where local management judgment and experience is most important. – Documentation is critical to the process; it lets the reviewer understand the thinking behind the rating and that mitigation is possible. <p>STEPS 3, 4, AND 5 OF THE COMPLEXITY ANALYSIS WILL BE COVERED IN UNIT 10.</p> <p>CLASS DISCUSSION:</p> <p>Slides 19 – 32 show examples of the 14 elements. The slides give an example of low and high summary ratings for each element identified.</p> <p>Each slide should be viewed with class discussion on possible mitigation measures that could be incorporated into the prescribed fire plan.</p> <p>The 14 elements may not be adequate for all or unique situations. Local issues, which are not properly addressed by the standard elements, may need to be addressed.</p> <p>Additional complexity elements can be added to these 14 standard elements. For all added elements, you should develop criteria for the three complexity factors to help distinguish between low, moderate, and high ratings.</p>	<p>4-18-RX341-PPT</p> <p>4-19-RX341-PPT thru 4-32-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>In some situations an element may not apply. In this case, do not delete the element; instead state that it does not apply. Individual element technical difficulty ratings provide skill position information (prescribed fire burn boss, firing boss, fire effects monitor, fire behavior analyst, safety officer, holding, etc.).</p> <p>Factors of elements rated as high may indicate that high levels of skill are needed. They may be reviewed by local fire managers and found to be routine. This may allow the element to be ranked lower than its highest individual factor.</p> <p>The elements and factors are not independent. Mitigating one frequently alters several others, such as adding more holding resources to mitigate the probability of escape increases the number and dependence of activities and project logistics.</p> <p>Items that can't be mitigated will be clearly identified in the final complexity rating and may influence the final complexity determination.</p> <p>Emphasize relating each prescribed fire plan element back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.</p> <p><u>End Class Discussion.</u></p>	

OUTLINE	AIDS & CUES
<p>EXERCISE: Preliminary Complexity Analysis</p> <p><u>Overview:</u> Students complete a Preliminary Rating and Rationale for assigned elements.</p> <p><u>Time:</u> 30 minutes</p> <p><u>Format:</u> Work groups</p> <p><u>Materials Needed:</u> Students will use their:</p> <ul style="list-style-type: none"> • Printed copy of the Red Bull Prescribed Fire Plan • Unit 4 Exercise Materials (on the student CD): <ul style="list-style-type: none"> – Red Bull Map 1 – Vicinity.pdf – Red Bull Map 2 – Adjacent Features.pdf – Red Bull Overview.ppt <p>Important: Students <u>should not view</u> the Red Bull Prescribed Fire Plan that is on their student CD because it contains the answers.</p> <p><u>Instructions:</u></p>	<p>4-33-RX341-PPT</p>
<ol style="list-style-type: none"> 1. Refer students to the Preliminary Complexity Analysis (SW pages 4.13 – 4.26; IG pages 4.17 – 4.30). The first one is completed as an example. 2. Assign each group two elements of the preliminary complexity analysis. Ensure the elements overlap. <ul style="list-style-type: none"> • For example, assign Group 1 elements 4 and 6, and assign Group 2 elements 6 and 7. This will allow groups to make comparative evaluations of their solutions at the conclusion of the exercise. 3. Have students complete a Preliminary Rating and Rationale for assigned elements. 	<p>4-2-RX341-IR/SR</p>

OUTLINE	AIDS & CUES
<ol style="list-style-type: none"> 4. Instructors/coaches should interact with groups and provide guidance as necessary. 5. Review the Red Bull Overview PowerPoint slides with students. 6. Review the completed Element 1: Potential for Escape, from the Red Bull Prescribed Fire Plan. 7. Have groups present their element complexity determination and rationale to the class. Allow time for instructor and student comments/questions after each presentation. 	
<p><u>End of Exercise.</u></p>	
<p>REVIEW UNIT OBJECTIVES.</p>	
<p>COMPLETE THE FOLLOWING:</p>	
<ul style="list-style-type: none"> • Administer Day 1 Quiz (students can use their reference material for the quiz). Allow 30 minutes for completion then collect quizzes. • Have students work on the elements of the burn plan that were just covered in class. If using the North Pine plan for the final project, refer students to the North Pine folder on their student CD. 	<p>4-34-RX341-PPT thru 4-58-RX341-PPT 4-59-RX341-PPT</p> <p>4-60-RX341-PPT</p>

Prescribed Fire Implementation Risk Assessment (This is an example of risk assessment that can be used)



Escape-Risk Assessment

(This is an example of risk assessment that can be used)







Relative Leveling Points	0	1	2	3	4	5	Total
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A. SITE SPECIFICS

Slope % (average)	<10	10-20	21-30	31-40	41-60	>60	
Aspect Inside Unit	-----	N	NE,NW	E,W,Flat	SE,SW	S	
Fuel Model Inside Unit	-----	8	1,5	9	2,11	3,4,10,12	

A. SUBTOTAL:

B. CONTAINMENT FACTORS FOR ESCAPED RUNNING HEAD-FIRE

Projected Flame Len. -ft.	<1.0	1.0-1.5	1.6-2.0	2.1-4.0	4.1-8.0	>8.0	
Projected R.O.S.- ch/hr.	-----	<2	2-4	5-7	8-10	>10	
Line Product Rate- ch/hr.	>20	19-20	16-18	13-15	10-12	<10	
Fireline Width-ft.	Island	>16	13-16	9-12	3-8	<3	
Fuel Model- Outside Unit (most prevalent)	-----	8	1,5	9	2,11	3,10,12	
Position on Slope	-----	Top,Flat	upper1/3	middle 1/3	lower 1/3	bottom	
Unit Configuration							
Unit Size - Acres	-----	<10.0	10.1-20.0	20.1-30.0	30.1-40.0	>40.0	
% Continuity of Fuel Adjacent to Burn Unit	<15	15-25	26-35	36-50	50-75	>75	
Time of Ignition	21-0600	06-0800	08-1000	10-1200	1200-1400	14-1600	

B. SUBTOTAL:

C. PRESCRIPTION PARAMETERS

Mid-Flame WS - mph	-----	3-4	5-6	7-8	9-15	<3 or >15	
1 hr. Fuel Moisture-% Fuel Model 1 or 2 Only	≥12	11	10	9	8	<8	
1 hr. Fuel Moisture-% Fuel Model 3 Only	>25	22-25	18-21	14-17	10-13	<10	
1 hr. Fuel Moisture-% Timber/Slash Group Only	>20	19-20	16-18	13-15	10-12	<10	
Relative Humidity-%	>75%	56-75%	46-55%	36-45%	25-35%	<25%	
Live Fuel Moisture-%	>300	201-300	151-200	101-150	50-100	<50	
Drought Index (KBDI)	<100	101-200	201-300	301-400	401-500	>500	

C. SUBTOTAL:

RATIONALE:	<45 = LOW RISK TOTAL POINTS (A.+B.+C.) ____ 45-75= MODERATE RISK >75= HIGH RISK FINAL ESCAPE-RISK RATING _____
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1. Potential for Escape

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Although holding forces have access around the entire unit, PI is at 60% at the hot end of the prescription.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Ignition procedures won't create intense fire until adequate buffers are in place. Grass fuels will not hold fire longer than the day of ignition. Fire behavior calculations and procedures for ignition, holding, mopup and patrol are outlined in the burn plan.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Potential for multiple simultaneous spot fires can propagate at moderate rates of spread, but can be held by skilled and prompt holding actions. Contingency forces must be available on call-up, commensurate with local wildfire standards.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Mow lines and wet lines will be constructed around the burn unit. Fire control resources will be placed at key locations on and adjacent to residential property. Lookouts will be placed at key locations to watch for slopovers and spot fires. Slow methodical backfiring techniques will be used along all burn unit boundaries to reduce the risk of escape. Engines will patrol the area after ignition to extinguish any remaining hot spots.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Holding operations will be supervised at the Single Resource Boss level. The entire burn unit is accessible to holding resources. No abnormal weather is anticipated and all key implementation personnel will be from the local area or from within the Great Plains Region.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Ignition and holding procedures and organization are outlined in the burn plan.

2. The Number and Dependency of Activities

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Moderate to extreme rates of spread can be expected if fire escapes into the grass fuel outside the burn unit. To reduce the risk of escape, adequate blacklines must be prepared before any head firing can safely be accomplished. Failure to accomplish these activities will require a change in the planned ignition and holding methods. Onsite resources should be adequate to adjust.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Ignition and holding procedures are outlined in the burn plan.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Coordination is critical for the successful completion of this burn. A lack of coordination would result in increased risk of escape and a compromise of crew and public safety.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	The ignition, holding, communications, escape contingency and mopup sections of the prescribed fire plan outline detailed methods and procedures for coordination.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Coordination activities require a moderate skill level. Continuous communication is necessary to manage the risk of escape, crew safety, and to successfully complete the burn.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Communication procedures are identified in the burn plan.

3. Offsite Values

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Some of the East Housing community is immediately inside the burn unit. Some of the agricultural fields outside the burn unit may not be harvested and could sustain fire. BIA Route 4 is to the north of the burn.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Threat of escape has been mitigated by ignition and holding procedures outlined in the burn plan. See the description in the potential consequence blocks for item 1 “Potential for Escape” of this complexity analysis.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Potential for multiple simultaneous spot fires that can propagate at moderate rates of spread, but can be held by skilled and prompt holding actions.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Mow lines and wet lines will be constructed between the burn unit and the housing development. Fire control resources will be placed at key locations on and adjacent to residential property. Lookouts will be placed at key locations to watch for slopovers and spot fires. Slow methodical backfiring techniques will be used along all burn unit boundaries to reduce the risk of escape. Engines will patrol the area after ignition to extinguish any remaining hot spots.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Protection of the East Housing homes and private property will require a moderate skill level and good team coordination.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	The ignition, holding, communications, escape contingency and mopup sections of the prescribed fire plan outline detailed methods and procedures to reduce the risk of escape.

4. Onsite Values

Risk	Rationale
Preliminary Rating: <i>Low Moderate <u>High</u></i>	Some areas of high value are located within the project area.
Final Rating: <i>Low <u>Moderate</u> High</i>	Special instructions will be given at the pre-burn briefing as to the treatment and mitigation of the structures.
Potential Consequences	Rationale
Preliminary Rating: <i>Low Moderate <u>High</u></i>	There are three structures within the unit.
Final Rating: <i>Low <u>Moderate</u> High</i>	Special instructions will be given during pre-burn briefing detailing the operations. The homeowner will provide an adequate mow line. Careful ignitions will be used to protect all structures within the burn unit.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low <u>Moderate</u> High</i>	Some pre-burn preparation work may be required.
Final Rating: <i>Low <u>Moderate</u> High</i>	No change.

5. Fire Behavior

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Single fuel model 3 is abundant throughout the burn unit. Fires are surface fires that move rapidly through the cured grass and associated material. Very little scrub or timber is present in the east and west draws, generally less than one-third of the area.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Fire behavior will be controlled by operating within prescribed conditions and following the ignition plan.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Fire behavior outside the unit would be the same as inside the unit in a similar fuel model (3). Fire behavior within the surrounding agricultural fields would be dictated by fuel loading, continuity and arrangement within the fields.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Standard fire safety precautions are adequate to ensure crew safety. As previously stated, slopovers and spot fires will be minimal if ignition plan and prescription parameters are followed. Direct attack by onsite holding resources should control any fire outside the unit. Adjacent agricultural fields will serve as fuel breaks in the event of an escape. Fire behavior will be assessed, but no special calculations will be necessary.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.

6. Management Organization

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Two levels of supervision are needed to safely implement the burn. A qualified Burn Boss, FIRB and Holding Boss with igniters, and holding crew are required. More than one position may be filled by a single (qualified) individual.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Problems related to supervision or communications are expected to be minimal. Supervisory crewmembers have worked together on many previous assignments and the entire burn unit is accessible on foot or by vehicle.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Agency/Tribal management meetings concerning the burn and a pre-burn briefing for all crewmembers will be held.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	At least one primary team member will need to come from outside of the local unit and may not be familiar with local factors.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	The numbers of qualified personnel available on the local unit are limited.

7. Public and Political Interest

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	The prescribed fire is visible to some portions of the public and/or moderate in size.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	The Agency will notify residents through the local newspaper and other postings.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Unexpected or adverse events would attract some local public and Tribal attention and may delay implementation of other treatments, but would not attract political or media attention unless a large escaped fire or serious loss of property or life occurred.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No special fire information function is needed. Local notification will be handled by the Crow Creek Agency.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.

8. Fire Treatment Objectives

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Fuel reduction objectives are easily achieved. The fire behavior needed to achieve them is easily created, managed and monitored.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Planned prescription parameters and ignition techniques will be followed.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Other opportunities to meet objectives will be available; however, the potential for wildfire exists throughout the fall and winter months. The longer the unit goes into the year without treatment, the higher the risk to community members.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Measures to achieve the objectives are easy to complete with few restrictions on techniques. The restrictions are related to ignition methods and are designed to mitigate the threat of escape. Only minor pre-burn monitoring will be required to determine if the unit is in prescription. Implementation monitoring can easily be achieved by the onsite resources.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Monitoring is built into the burn plan.

9. Constraints

Risk	Rationale
Preliminary Rating: <div>Low Moderate High</div>	Other than weather conditions required to meet prescribed conditions, there are no constraints.
Final Rating: <div>Low Moderate High</div>	Weather parameters outlined in the burn plan will be followed.
Potential Consequences	Rationale
Preliminary Rating: <div>Low Moderate High</div>	The burn can be implemented whenever it is in prescription.
Final Rating: <div>Low Moderate High</div>	No change.
Technical Difficulty	Rationale
Preliminary Rating: <div>Low Moderate High</div>	Constraints (weather parameters) do not increase the difficulty of completing this burn.
Final Rating: <div>Low Moderate High</div>	No change.

10. Safety

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Safety issues are easily identified and mitigated, yet detailed briefings are needed to raise safety consciousness of the crew due to the location of East Housing community and the potential for adverse impacts in the event of an escape. Fatigue and exposure to risks are limited.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Safety precautions are built into the burn plan.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	There is potential for serious accidents or injury to firefighters or the public. Tires and combustible sharp objects are lying around throughout the burn unit. There is uneven footing for igniters along slopes and throughout the unit.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Removal of tires and junk from the path of the igniters will be done prior to the day of the burn. Safety precautions are built into the burn plan.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Most of the safety concerns can be easily mitigated through LCES and following the Ignition Plan. A standard safety briefing will adequately cover them. Special emphasis is needed and caution will be taken to protect the East Housing community against escape; the project briefing will cover this. Limited mitigation is needed.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Safety precautions and mitigation measures are in the burn plan.

11. Ignition Procedures/Methods

Risk	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Firing sequence and timing are important. The unit is a 37-acre grass field with 60% slopes in the southern regions of the unit.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Occasional alterations of planned ignition procedures are written into the burn plan to accommodate unforeseen site/time specific situations.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Firing methods and procedures must be coordinated to provide for safety, meet objectives, and reduce the risk of escape.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Vehicle access and hose lays to the entire unit provides opportunities to alter or extinguish firing operations if necessary.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No special firing equipment, techniques or patterns are needed. Procedures are simple, the ignition team is small and only one type of ignition device is needed. The ignition pattern requires minimal supervision of the igniters to achieve objectives and manage safety concerns.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Ignitions have been done the same in the past to this unit. Personnel are experienced and have local knowledge of the unit.

12. Interagency Coordination

Risk	Rationale
Preliminary Rating: <div>Low Moderate High</div>	Lower Brule Agency and Crow Creek have done business for many years and the equipment is universal. National and regional preparedness levels are expected to be at PL3 or less at the time the burn is conducted.
Final Rating: <div>Low Moderate High</div>	No change.
Potential Consequences	Rationale
Preliminary Rating: <div>Low Moderate High</div>	The burn can be completed as planned.
Final Rating: <div>Low Moderate High</div>	No change.
Technical Difficulty	Rationale
Preliminary Rating: <div>Low Moderate High</div>	No interagency issues. No communication or coordination issues. No special agreements needed. Due to the time of year this burn will be conducted, adequate interagency resources will be available if needed.
Final Rating: <div>Low Moderate High</div>	No change.

13. Project Logistics

Risk	Rationale
<i>Low</i> <i>Moderate</i> <i>High</i>	Some logistic support will be needed for the amount of time needed to complete this burn.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	All required equipment and supplies are readily available and there are no special transportation, storage or communication needs. Ignition and mopup are expected to be completed in one day with rapid burnout of grass fuels.
Potential Consequences	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	Problems related to logistics will increase the risk of escape or affect the safe completion of the burn.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	If ignition sequences are followed, this burn should only take one day to complete.
Technical Difficulty	Rationale
Preliminary Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No logistical support operation anticipated.
Final Rating: <i>Low</i> <i>Moderate</i> <i>High</i>	No change.

14. Smoke Management

Risk	Rationale
Preliminary Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	The Crow Creek Agency has indicated that area residents are more concerned about reduction of hazardous fuels than the short-term smoke this burn will produce. No negative health or safety issues related to smoke amounts or exposure are anticipated.
Final Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	Smoke management is addressed in the burn plan.
Potential Consequences	Rationale
Preliminary Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	Minor short-term impacts to the East Housing community and area roads are anticipated. Road monitors and/or traffic control personnel will be used if conditions dictate. Crew and public exposure to smoke is expected to be minimal and not cause health or safety concerns.
Final Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	Smoke management is addressed in the burn plan.
Technical Difficulty	Rationale
Preliminary Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	No special operational procedures are required due to community support of hazardous fuel reduction at the expense of short-term smoke exposure.
Final Rating: <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div>	The smoke management section of the burn plan indicates that a southerly wind is preferred, but is not a limiting factor for ignition.

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 5 – Prescription Development and Scheduling

Time 2.5 Hours

Objectives

1. Describe ranges of acceptable prescription parameters to produce fire behavior that meets fire effects objectives and control limitations.
2. Identify the components of fuels and weather that contribute to the development of the prescription.
3. Demonstrate how fire modeling outputs may be used to develop prescriptions.
4. Discuss how the assumptions and limitations in the fire spread model relate to prescribed fire.
5. List supporting documentation that may be required for the prescription.

Strategy

This unit provides an understanding of how to write a viable prescription for a prescribed fire plan. The unit looks at components and discusses the tools used to develop a prescription.

On completion of the unit, instructors should emphasize the relationship between each prescribed fire plan element(s) and the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 7 and 8 of the Day 2 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan

Optional Materials to Support the Unit

- ☐ The instructor may provide examples of completed prescribed fire prescriptions and supporting documentation.

Exercises

- Red Bull Prescription (page 5.17)
- Prescription Development (page 5.18)

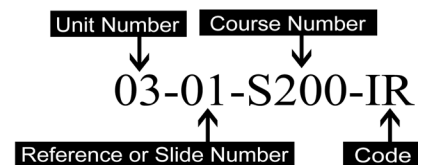
Outline

- I. Developing Prescription Parameters
- II. Components of Fuels and Weather
- III. Assumptions and Limitations of the Fire Spread Model
- IV. Using Fire Modeling Outputs
- V. Scheduling

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 5 – Prescription Development and Scheduling

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	5-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	5-2-RX341-PPT
I. DEVELOPING PRESCRIPTION PARAMETERS	
REFER STUDENTS TO THE PRESCRIBED FIRE PLAN TEMPLATE, ELEMENT 7 (THE GUIDE, PAGE 38).	The Guide
A. What is “Prescription?” Prescription is the measurable criteria that define a range of conditions during which a prescribed fire may be ignited and held as a prescribed fire. <ul style="list-style-type: none">• Describes a range of low to high limits for the environmental parameters (weather, topography, fuel conditions, etc.).• Describes fire behavior parameters (flame lengths, rate of spread, spotting distance, etc.).• Parameters are generally quantitative variables expressed as a range that meet project objectives.• Some prescription variables (such as spotting) are expressed as a “not to exceed limit.”• A well-defined prescription is critical to success.	5-3-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="261 281 1065 321">B. Design Prescription to Meet Project Objectives.</p> <p data-bbox="358 365 1032 447">1. Prescription development is a four step process:</p> <ul data-bbox="451 491 1138 877" style="list-style-type: none"> <li data-bbox="451 491 1138 573">• Identify fire and resource objectives, control limitations, and other constraints. <li data-bbox="451 617 1138 741">• Determine parameters (fuel, weather, season, and topographic variables) that will result in desired fire behavior. <li data-bbox="451 785 1138 877">• Develop desired fire behavior prescription to accomplish objectives. <p data-bbox="521 921 1138 1087">Compare outputs to objectives to set high and low prescription limits. For example, flame lengths (output) vs. scorch height (objective).</p> <ul data-bbox="451 1131 927 1171" style="list-style-type: none"> <li data-bbox="451 1131 927 1171">• Document the prescription. <p data-bbox="521 1215 1105 1339">A prescribed fire plan preparer must translate most objectives into definable fire behavior outputs.</p> <p data-bbox="358 1383 1130 1465">2. In developing a prescription, ask two primary questions:</p> <ul data-bbox="451 1509 1114 1894" style="list-style-type: none"> <li data-bbox="451 1509 1114 1728">• What weather parameters produce fire behavior that meets the objectives? <ul data-bbox="521 1646 756 1728" style="list-style-type: none"> <li data-bbox="521 1646 756 1686">– Short-term <li data-bbox="521 1686 756 1728">– Long-term <li data-bbox="451 1772 1114 1894">• What fire behavior is needed to achieve resource management and control objectives? 	<p data-bbox="1175 281 1422 321">5-4-RX341-PPT</p> <p data-bbox="1175 1383 1422 1423">5-5-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="167 283 976 317">II. COMPONENTS OF FUELS AND WEATHER</p> <p data-bbox="261 369 1036 449">Not all of the following environmental variables are required in a prescription.</p> <p data-bbox="261 499 1031 579">The key is deciding what variables will produce the prescribed fire behavior to meet objectives.</p> <p data-bbox="167 625 1138 705">REFERENCE “AIDS TO DETERMINING FUEL MODELS FOR ESTIMATING FIRE BEHAVIOR” (STUDENT CD).</p> <p data-bbox="261 751 574 785">A. Fuel Variables</p> <ol style="list-style-type: none"> <li data-bbox="358 835 857 869">1. Dead fuel moisture content <ul style="list-style-type: none"> <li data-bbox="453 919 1073 999">• Expressed as a percent of oven-dried weight of the fuel. <li data-bbox="453 1050 1109 1171">• Classified by fuel size; determines how much of the fuel is available during combustion. <li data-bbox="358 1222 784 1255">2. Duff moisture content <ul style="list-style-type: none"> <li data-bbox="453 1306 1073 1386">• Expressed as a percent of oven-dried weight of the duff. <li data-bbox="453 1436 1101 1558">• Influences consumption of duff and organic soils in smoldering or glowing combustion. <li data-bbox="453 1608 938 1642">• Influences duration of burn. 	<p data-bbox="1175 751 1422 785">5-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>3. Live fuel moisture content</p> <ul style="list-style-type: none"> Expressed as a percent of oven-dried weight of the fuel. Determines the live fuels contribution to fire behavior. Determines the effect of the fire behavior on the live vegetation. <p>State of development of the live vegetation has a major impact on plant response post-fire.</p> <p>B. Weather Variables (inputs)</p> <p>1. Temperature</p> <ul style="list-style-type: none"> Influences how fast fuels dry, and also their moisture content. Influences scorch height and probability of ignition (PIG). <p>2. Relative humidity</p> <p>Relative humidity influences fuel moisture content, especially of 1- and 10-hr fuels which are the major contributors to fire behavior.</p>	<p>5-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="358 281 537 317">3. Wind</p> <p data-bbox="451 367 1135 491">Wind is often the most important fire weather variable, due to its effect on fire behavior outputs.</p> <ul data-bbox="451 537 781 661" style="list-style-type: none"> • Flame lengths • Rate of spread • Spotting distance <p data-bbox="261 707 1044 747">C. Time Variables/Seasonal Timing (scheduling)</p> <p data-bbox="358 793 586 829">1. Seasonal</p> <ul data-bbox="451 879 1086 1129" style="list-style-type: none"> • Season of the year influences plant condition, sprouting, seed source, and potential insect attack. • Burning during various seasons can significantly affect plant response. <p data-bbox="167 1178 461 1213">ASK STUDENTS:</p> <p data-bbox="451 1264 1149 1388">Where would you find information concerning the best time of year/season, or development stage of vegetation, to apply prescribed fire?</p> <p data-bbox="451 1436 1127 1518">Possible answers: Fire Effects Information System (FEIS), NEPA, resource specialist.</p> <p data-bbox="358 1564 821 1600">2. Diurnal weather patterns</p> <p data-bbox="451 1650 1094 1774">Changes in temperature, relative humidity, and wind speed can significantly affect fire behavior and first order effects.</p> <p data-bbox="167 1820 1102 1894">DISCUSS EXAMPLES OF USING DIURNAL CHANGES FOR IMPLEMENTATION.</p>	<p data-bbox="1175 707 1422 743">5-8-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="261 281 1105 363">D. Tools for Identifying Desired Fuel Conditions and Scheduling Implementations</p> <p data-bbox="167 409 932 447">THIS IS ONLY A PARTIAL LIST OF TOOLS.</p> <ol style="list-style-type: none"> <li data-bbox="358 495 997 577">1. National Fire Danger Rating System (NFDRS) <li data-bbox="358 625 1138 1129">2. Energy Release Component (ERC) <ul style="list-style-type: none"> <li data-bbox="456 709 1138 791">• Related to the heat release rate within the flaming front of a moving fire. <li data-bbox="456 837 813 875">• Has low variability. <li data-bbox="456 921 1105 1045">• The best fire danger component for indicating the effects of intermediate to long-term drying on fire behavior. <li data-bbox="456 1092 1117 1129">• Not intended for use as a drought index. <li data-bbox="358 1178 1143 1808">3. Burning Index (BI) <ul style="list-style-type: none"> <li data-bbox="456 1262 1094 1344">• Function of the spread component and the energy release component. <li data-bbox="456 1390 899 1428">• Has moderate variability. <li data-bbox="456 1474 889 1512">• Sensitive to fuel models. <li data-bbox="456 1558 1143 1682">• Can trace seasonal trends reasonably well for models with heavy dead or live components. <li data-bbox="456 1728 1084 1808">• Very sensitive to weather observation errors. 	<p data-bbox="1175 281 1422 319">5-9-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>4. Keetch Byram Drought Index (KBDI)</p> <ul style="list-style-type: none"> Measures moisture in deep duffs or upper soil layers. Varies from 0 (wet) to 800 (dry). <p>5. 1000-Hour Time Lag Fuel Moisture (TLFM)</p> <ul style="list-style-type: none"> Dead fuel moisture responds solely to ambient environmental conditions. Any use of the 1000-hr TLFM as a separate "index" must be preceded by an analysis of historical fire weather data to identify critical levels of 1000-hr TLFM. 	
<p>E. Fire Behavior Variables (outputs)</p> <p>1. Rate of spread</p> <ul style="list-style-type: none"> The relative activity of a fire in extending its horizontal dimensions. Usually measured in chains/hour. Important inside a unit as an estimator of relative ease of fire spread throughout the planned area and for safety. Important outside the unit when contingency planning is critical to the burn. 	<p>5-10-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>2. Fireline intensity</p> <ul style="list-style-type: none"> • The rate of heat release per unit width of the flaming front per unit time. • Measured in BTU/ft/sec. • Useful in planning for control forces and their ability to attack a fire front. • Difficult to measure, but can be closely approximated because of its strong correlation with flame length. <p>3. Flame length</p> <ul style="list-style-type: none"> • Correlated with fireline intensity. • Important for predicting fire effects. • Flame length has many uses in prescribed fire planning (type, amount of control forces needed). <p>4. Additional outputs</p> <ul style="list-style-type: none"> • Spotting distance • Scorch height • Mortality • Probability of ignition • Other? 	

OUTLINE	AIDS & CUES
<p data-bbox="167 281 1089 359">III. ASSUMPTIONS AND LIMITATIONS OF THE FIRE SPREAD MODEL</p> <p data-bbox="167 411 1094 533">REFERENCE “HOW TO PREDICT THE SPREAD AND INTENSITY OF FOREST AND RANGE FIRES” (STUDENT CD).</p> <p data-bbox="261 579 1089 615">A. Intended to Describe a Flame from Surface Fuels</p> <p data-bbox="358 667 1146 789">Does not describe crown fire behavior which may be needed to meet prescription objectives in certain vegetation types (juniper conversion).</p> <p data-bbox="261 835 1101 913">B. Describes Behavior at the Head of the Fire Where the Fine Fuels are Assumed to Carry the Fire</p> <p data-bbox="358 963 1122 1085">Does not consider smoldering phase of a fire. The burnout of fuels, usually large fuels and compacted litter, behind the flame front is not described.</p> <p data-bbox="261 1131 1045 1209">C. Assumes Fuels, Weather, and Topography are Uniform and Continuous</p> <p data-bbox="358 1262 1130 1425">Your prescribed fire project area may have multiple fuel models which may require multiple prescriptions or utilization of the predominant fuel model for prescription development.</p> <p data-bbox="261 1474 1040 1551">D. Does not Consider the Effects of Long-Range Spotting on the Main Fire Behavior</p> <p data-bbox="358 1604 1094 1682">You may need to develop a cooler prescription to eliminate or minimize spotting potential.</p> <p data-bbox="358 1734 1105 1856">You may need to go into the spot module to determine potential holding problems and develop additional holding and contingency needs.</p>	<p data-bbox="1174 281 1443 317">5-11-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="167 281 850 317">IV. USING FIRE MODELING OUTPUTS</p> <p data-bbox="261 367 976 491">Due to modeling limitations, a calibration of fire behavior outputs may be required to correct over- and underpredictions of fire behavior.</p> <p data-bbox="261 537 1084 705">When developing prescriptions, prescribed fire plan preparers should use subject matter experts such as fire behavior analysts (FBAN), long term fire analysts (LTAN), and fire ecologists.</p> <p data-bbox="261 751 1096 875">You may also use historical fire behavior data such as previous prescribed fire plans, empirical data, post-burn reports, and other publications.</p> <p data-bbox="261 921 1066 961">A. Description of Low to High Prescription Limits</p> <ul data-bbox="358 1008 1143 1388" style="list-style-type: none"> <li data-bbox="358 1008 1143 1134">• Describe the low to high limits required to meet prescribed fire plan objectives while meeting smoke management and control objectives. <li data-bbox="358 1180 1143 1262">• The description includes environmental and fire behavior parameters. <li data-bbox="358 1308 1143 1388">• The description may illustrate a combination of prescriptive elements that are excluded. <p data-bbox="427 1434 1143 1558">For example, the prescription might accept high wind speeds and low humidity, but won't accept them at the same time.</p>	<p data-bbox="1174 281 1443 317">5-12-RX341-PPT</p> <p data-bbox="1174 921 1443 957">5-13-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>B. Fire Behavior Predictions for Fuels Outside the Ignition Area</p> <ul style="list-style-type: none"> • When developing holding and contingency plans, consider the predicted fire behavior outside of the project boundary. • Fire behavior characteristics for fuel models within the maximum spotting distance, or adjacent to the project boundaries, must be considered and modeled using worst-case fire behavior predictions. • These predictions should be identified from fire behavior model runs of the hottest, driest, and windiest prescription conditions identified in the plan, along with the most extreme environmental conditions. 	5-14-RX341-PPT
<p>C. Separate Prescription for Multiple Fuel Models</p> <ul style="list-style-type: none"> • May be needed for multiple fuel model conditions to address seasonal differences and/or types of ignition (blacklining, aerial ignition, etc.). • May result in multiple complexity ratings and burn organizations. • May result in the need to identify multiple levels of management, organizational structures, implementation measures, and pre-burn considerations. 	5-15-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="261 281 716 317">D. Fire Behavior Narrative</p> <p data-bbox="358 367 1138 533">Should include a summary of the fire behavior identified in the prescription and how it will achieve the desired treatment objectives. Check agency guidelines.</p> <p data-bbox="358 579 708 619">Suggested information:</p> <ul data-bbox="358 665 1105 743" style="list-style-type: none"> • Fire behavior resulting from unique fuels and environmental conditions. <p data-bbox="427 793 1097 871">For example, “Occasional torching of Rocky Mountain Juniper may be observed.”</p> <ul data-bbox="358 921 1125 1087" style="list-style-type: none"> • Any historical evidence for over- or underpredictions of the fire behavior modeling program used, and the possible or probable effects to the actual fire behavior. <p data-bbox="427 1138 1138 1341">For example, “Previous prescribed fires implemented in the area in like fuel type and loadings show fire behavior predictions are overpredicted by a factor of .3; therefore, actual flame lengths may be 3 feet instead of 4.2.”</p> <ul data-bbox="358 1392 1114 1470" style="list-style-type: none"> • Any onsite conditions that may cause over- or underpredictions vs. actual fire behavior. <p data-bbox="427 1520 1117 1640">For example, “Fine grass fuel loadings are not continuous across the project area; therefore, rates of spread may be lower than modeled.”</p> <ul data-bbox="358 1690 1125 1810" style="list-style-type: none"> • Any ignition techniques that will be implemented to ensure prescriptive parameters are met. 	<p data-bbox="1175 281 1443 317">5-16-RX341-PPT</p>

OUTLINE		AIDS & CUES
V.	<p>SCHEDULING</p> <p>A. Identify the General Ignition Timeframes</p> <ul style="list-style-type: none"> • Time of day and/or duration of ignition • Season(s)/year(s) • Restricted dates <p>At national preparedness levels 4 and 5, prescribed fire plan implementation is restricted (regardless of prescribed fire plan language).</p> <p>How long is a prescribed fire plan good for?</p> <p>Not specified in “The Guide.” See responsibilities of burn boss, technical reviewer, and agency administrator (these three are primary in determining plan longevity).</p>	5-17-RX341-PPT
	<p>B. Supporting Documentation</p> <ul style="list-style-type: none"> • Required appendices include fire modeling outputs and/or historical evidence. • Include modeling documentation (BehavePlus runs). • Only include those modeling runs that pertain to those prescriptive elements described in the plan. • Empirical evidence (historical evidence or researched data) and judgment may be used to identify or calibrate prescriptions. 	5-18-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> Any empirical evidence used must be included in the plan appendix or as a fire behavior narrative. Documentation of fire behavior is critical. <p>What element typically covers post-fire behavior documentation?</p> <p>The Guide, Element 20, Monitoring.</p> <p>IMPORTANT: Before conducting the following exercises, tell students that BehavePlus (and other fire behavior models) provide <u>estimates</u> and are not to be taken <u>literally</u>, especially to the nearest decimal point. Most of the percentage answers are ok if rounded to the nearest 10%.</p>	

OUTLINE	AIDS & CUES
<p>EXERCISE: Red Bull Prescription</p> <p><u>Time:</u> 30 minutes</p> <p><u>Format:</u> Work groups</p> <p><u>Materials Needed:</u> Red Bull Prescribed Fire Plan</p> <p><u>Instructions:</u> Students are to review the Prescription element in the Red Bull Prescribed Fire Plan and answer the questions. When finished, discuss answers.</p> <ol style="list-style-type: none"> 1. From the Red Bull Prescription element narrative, how is the prescription limited? <p>From Red Bull “. . . a mid-flame wind speed limitation of 3-7 mph will be established to limit flame lengths and rates of spread and thereby decrease spot fire potential and assist crews in catching the fire in the event of an escape.” And “. . . a minimum of 3 mph winds and limited temperatures/relative humidities, that allow at least 8- to 10-foot flame lengths (up to a maximum of 17 feet) and projected unit interior rates of spread greater than 50 chains/hour (following completion of adequate blacklines), are needed to meet treatment objectives.”</p> <ol style="list-style-type: none"> 2. How does the Red Bull prescription meet the prescribed fire plan objectives? <p>By primarily controlling flame length, which in turn, is controlled by wind speed, fine dead herbaceous fuel moistures, and ignition patterns.</p> <p><u>End of Exercise.</u></p>	<p>5-19-RX341-PPT</p>

Exercise: Prescription Development

Prescribed Fire Plan Prescription Development:

You are developing a prescription for a rangeland and forest restoration project. The project area is located on a south aspect in a fuel model 2 with ponderosa pine. Small 3-foot tall ponderosa pine is encroaching into the rangelands. The regeneration is also scattered as an understory within the mature ponderosa pine trees.

Due to past experience with prescribed fires in the area, your fire management officer (FMO) has constrained your spot fire distance allowed to .3 mile and probability of ignition to less than 60%. Experience has also shown that when predicted mortality probability reaches above 45% an unacceptable loss in older growth trees occurs.

Resource Objectives:

- Restore the rangelands and forest structures within the project area.
- Reduce crown fire damage potential to mature ponderosa pine.
- Retain the mature tree canopy structure within the project area.

Prescribed Fire Objectives:

- Remove $\geq 90\%$ of 3-foot tall or less ponderosa pine encroachment into the grasslands and within mature tree understory.
- Limit mortality of mature (10-inch or greater) ponderosa pine trees to $\leq 30\%$.
- Limit scorch height to < 35 feet.

Instructions:

Use the following BehavePlus inputs and complete the runs. Use the results from the runs to complete the missing information in the prescription table. Be prepared to discuss and justify your answers.

Inputs: Surface, Scorch, Mortality (head fire)

Modules: SURFACE, SCORCH, MORTALITY

Description Unit 5 RX Development : Surface Scorch Mortality

Fuel/Vegetation Surface/Understory

Fuel Model 2

Fuel/Vegetation Overstory

Tree Height ft 65

Crown Ratio .45

Mortality Tree Species pinpon

D.B.H. in 10

Fuel Moisture

1-h Moisture % 3, 6, 9, 12, 15

10-h Moisture % 7

100-h Moisture % 9

Live Herbaceous Moisture % 30

Live Woody Moisture %

Weather

Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0

Air Temperature oF 70

Terrain

Slope Steepness % 20

Acceptable Fire Conditions

Surface Rate of Spread (maximum) (ch/h) ☐ 0.0 - 0.0

Flame Length (ft) ☐ 0.0 - 0.0

Scorch Height (ft) ☒ 3 - 35

Probability of Mortality (%) ☒ 0 - 30

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]
(continued on next page)

Inputs: Surface, Scorch, Mortality (backing fire)

Modules: SURFACE, SCORCH, MORTALITY

Description Unit 5 RX Development : Surface Scorch Mortality

Fuel/Vegetation, Surface/Understory

Fuel Model 2

Fuel/Vegetation, Overstory

Tree Height ft 65

Crown Ratio .45

Mortality Tree Species pinpon

D.B.H. in 10

Fuel Moisture

1-h Moisture % 3, 6, 9, 12, 15

10-h Moisture % 7

100-h Moisture % 9

Live Herbaceous Moisture % 30

Live Woody Moisture %

Weather

Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0

Air Temperature oF 70

Terrain

Slope Steepness % 20

Fire

Spread Direction (from upslope) deg 180

Acceptable Fire Conditions

Surface Rate of Spread (ch/h) ☐ 0.0 - 0.0

Flame Length (ft) ☐ 0.0 - 0.0

Scorch Height (ft) ☒ 3 - 35

Probability of Mortality (%) ☒ 0 - 30

Run Option Notes

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always
for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Wind is blowing upslope [SURFACE].

(continued on next page)

Inputs: Ignite

Modules: IGNITE

Description	Unit 5 RX Development : Ignite
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Fuel Moisture

1-h Moisture	%	3, 6, 9, 12, 15
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Weather

Air Temperature	oF	70
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Fuel Shading from the Sun	%	50
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Acceptable Fire Conditions

Probability of Ignition from a Firebrand (%) ☒ 0 ☐ - 60

Run Option Notes

None

Output Variables

Probability of Ignition from a Firebrand (%) [IGNITE]

Notes

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Inputs: Spot

BehavePlus 3.0.2		Wed, Nov 14, 2007 at 15:03:51		Page 1	
Modules: SPOT					
Description		Unit 5 Rx Development: Spot			
Fuel/Vegetation, Overstory					
Canopy Height	ft			65	
Tree Height	ft			45	
Spot Tree Species				pinpon	
D.B.H.	in			10	
Weather					
20-ft Wind Speed (upslope)	mi/h			0, 7, 14, 21, 28, 35	
Terrain					
Ridge-to-Valley Elevation Difference	ft			200	
Ridge-to-Valley Horizontal Distance	mi			.5	
Spotting Source Location				mw	
Fire					
Number of Torching Trees				1	
Acceptable Fire Conditions					
Spot Dist from Torching Trees	(mi)	<input checked="" type="checkbox"/>		0.0	- 0.3

1. Use the inputs on the previous pages and the prescribed fire plan objectives to complete the prescription table (fill in shaded areas).

Weather	Minimum Fire Behavior	Maximum Fire Behavior
Temperature (deg F)	N/A	70
RH (%)	N/A	20
Mid Flame Wind Speed (mph)	0	6
Wind Direction (down slope winds or side slope winds 90° or less from down slope not acceptable, too hard to control flame lengths)	Upslope	Side slope, 90° or less from upslope

Fuel Moistures (%)	Minimum Fire Behavior	Maximum Fire Behavior
1 Hr (%)	12	6
10 Hr (%)	N/A	7
100 Hr (%)	N/A	9
Live Herbaceous (%)	N/A	30

Fire Behavior	Minimum Fire Behavior	Maximum Fire Behavior
Flame Length (ft)	1	6
Rate of Spread	N/A	N/A
Spotting Distance (mi)	0	0.3
Probability of Ignition (%)	N/A	53
Scorch Height (ft)	3	30
Mortality (%) – 10" DBH trees	0	10 (see further explanation on page 5.28 under Probability of Mortality table)
Mortality (%) – 3 ft trees	90	100

2. Is it better to use a backing fire or a strip head fire for this project? Explain.

Backing fire will provide better overall results; flame length and scorch are less, making it easier to meet objectives. Note: where you are lighting multiple strips, you will actually have a combination of backing and strip head fire. But you will be controlling your strip head fire by narrowing up your distance between strips under closed canopy timber.

Step 1 – In the Ignite module, limit the probability of ignition to < 60% as stated by the FMO in the prescribed fire scenario.

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Modules: **IGNITE**

Description _____ Unit 5 RX Development : Ignite

Fuel Moisture

1-h Moisture % 3, 6, 9, 12, 15

Weather

Air Temperature oF 70

Fuel Shading from the Sun % 50

Acceptable Fire Conditions

Probability of Ignition from a Firebrand (%) ☒ 0 - 60

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Unit 5 RX Development: Ignite

1-h Moisture %	Firebrand Ignition %
3	81
6	53
9	34
12	21
15	13

The results of the Ignite run show that the minimum 1-hr fuel moisture to meet objectives is 6%.

Step 2 – Using the spot module, limit the spotting distance to ≤ 0.3 miles as stated by the FMO in the prescribed fire scenario.

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Modules: SPOT

Description ➡ Unit 5 Rx Development: Spot

Fuel/Vegetation, Overstory

Canopy Height ft ➡ 65

Tree Height ft ➡ 45

Spot Tree Species ➡ pinpon

D.B.H. in ➡ 10

Weather

20-ft Wind Speed (upslope) mi/h ➡ 0, 7, 14, 21, 28, 35

Terrain

Ridge-to-Valley Elevation Difference ft ➡ 200

Ridge-to-Valley Horizontal Distance mi ➡ .5

Spotting Source Location ➡ mw

Fire

Number of Torching Trees ➡ 1

Acceptable Fire Conditions

Spot Dist from Torching Trees (mi) ☒ 0.0 - 0.3

20-foot wind speeds calculated with wind adjustment factor of 0.3.

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Unit 5 Rx Development: Spot

20-ft Wind mi/h	Torch Tree Spot Dist mi
0	0.0
7	0.1
14	0.2
21	0.3
28	0.3
35	0.4

The results of the Spot run show that spotting distance should be limited to a maximum of 21 mph, 20' winds (translates to an estimated 6.3 or 6 mph mid-flame wind speed).

Step 3 – Determine the limits to scorch and mortality.

Scorch ≤ 35 ft. (prescribed fire objective #3) and at least 3 ft. minimum to meet mortality objective for regeneration (prescribed fire objective #1).

Mortality $\leq 10\%$ for trees greater than 10 in. DBH (prescribed fire objective #2) and $\geq 90\%$ for trees 3 ft. tall or less (prescribed fire objective #1).

Head Fire Run:

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Modules: SURFACE, SCORCH, MORTALITY

Description Unit 5 RX Development: Surface Scorch Mortality

Fuel/Vegetation Surface/Understory

Fuel Model 2

Fuel/Vegetation Overstory

Tree Height ft 65

Crown Ratio .45

Mortality Tree Species pinpon

D.B.H. in 10

Fuel Moisture

1-h Moisture % 3, 6, 9, 12, 15

10-h Moisture % 7

100-h Moisture % 9

Live Herbaceous Moisture % 30

Live Woody Moisture %

Weather

Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0

Air Temperature oF 70

Terrain

Slope Steepness % 20

Acceptable Fire Conditions

Surface Rate of Spread (maximum) (ch/h) ☐ 0.0 - 0.0

Flame Length (ft) ☐ 0.0 - 0.0

Scorch Height (ft) ☒ 3 - 35

Probability of Mortality (%) ☒ 0 - 30

Unit 5 RX Development: Surface Scorch Mortality
Scorch Height (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	16	28	48	71	94	117
6	13	22	38	55	72	88
9	11	19	33	47	62	76
12	8	14	23	32	40	48
15	2	2	2	2	3	2

1-hour fuel moisture at 3% was previously eliminated by the Ignite run and mid-flame wind speed to 6 or less by the Spot run. The above scorch run indicates that the prescription window is further limited to combinations of 1-hr fuel moistures between 6 – 12% and the midflame windspeed between 0 – 6 mi/h. The scenario states that when mortality probability reaches 45% an unacceptable loss of older growth trees occurs. The mortality objective allows for a slightly wider prescription window than scorch; therefore, the scorch objective will drive the prescription limits.

Unit 5 RX Development: Surface Scorch Mortality
Probability of Mortality (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	25	25	79	99	99	99
6	25	25	27	96	99	99
9	25	25	25	75	98	99
12	25	25	25	25	34	80
15	25	25	25	25	25	25

***BehavePlus tends to overestimate mortality; limiting flame lengths with ignition patterns provides the greatest control over mortality and experience indicates that 10% is attainable (even the backing fire run shows 25% mortality with predicted flame lengths of 2 ft. or less).**

Unit 5 RX Development: Surface Scorch Mortality
Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	3.3	4.9	7.4	9.9	12.4	14.9
6	2.8	4.2	6.3	8.5	10.7	12.8
9	2.6	3.8	5.8	7.9	9.8	11.8
12	2.1	3.1	4.7	6.3	7.9	9.4
15	0.6	1.0	1.5	2.0	2.4	2.5

Maintaining flame lengths between 1 and 6 ft. should meet the scorch and mortality objectives.

Backing Fire Run:



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Page 1

Modules: SURFACE, SCORCH, MORTALITY

Description Unit 5 RX Development : Surface Scorch Mortality

Fuel/Vegetation Surface/Understory

Fuel Model 2

Fuel/Vegetation Overstory

Tree Height ft 65

Crown Ratio .45

Mortality Tree Species pinpon

D.B.H. in 10

Fuel Moisture

1-h Moisture % 3, 6, 9, 12, 15

10-h Moisture % 7

100-h Moisture % 9

Live Herbaceous Moisture % 30

Live Woody Moisture %

Weather

Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0

Air Temperature oF 70

Terrain

Slope Steepness % 20

Fire

Spread Direction (from upslope) deg 180

Acceptable Fire Conditions

Surface Rate of Spread (ch/h) ☐ 0.0 - 0.0

Flame Length (ft) ☐ 0.0 - 0.0

Scorch Height (ft) ☒ 3 - 35

Probability of Mortality (%) ☒ 0 - 30

It is critical to understand that realistically, you are not going to start a backing fire on the high end of the unit and downwind (assuming upslope winds) and just let it back down through a unit. You would typically want to use a combination of strip head and backing fire as you progress downslope through the unit. By adjusting strip width you can control flame lengths, thereby reducing the potential scorch and mortality of overstory trees. The key factor for the igniters is to ensure that correct flame lengths are produced/maintained throughout the ignition phase of the burn. The optimal flame lengths under closed canopy timber should be in the 1- to 2-foot range, which is best produced with a backing fire. In the open rangelands, where killing the encroaching pine is the objective, flame lengths up to 6 feet are acceptable.

Unit 5 RX Development: Surface Scorch Mortality
Scorch Height (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	6	6	5	4	3	2
6	5	5	3	3	2	1
9	4	4	3	2	2	1
12	3	3	2	1	1	1
15	1	0	0	0	0	0

Minimum scorch height of 3 ft. should ensure $\geq 90\%$ mortality of 3 ft. or less trees.

Unit 5 RX Development: Surface Scorch Mortality
Probability of Mortality (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	25	25	25	25	25	25
6	25	25	25	25	25	25
9	25	25	25	25	25	25
12	25	25	25	25	25	25
15	25	25	25	25	25	25

Unit 5 RX Development: Surface Scorch Mortality
Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
3	1.6	1.9	2.1	2.3	2.4	2.5
6	1.4	1.6	1.8	2.0	2.1	2.2
9	1.3	1.5	1.7	1.8	1.9	2.0
12	1.0	1.2	1.4	1.5	1.5	1.6
15	0.3	0.4	0.4	0.5	0.5	0.5

Step 4. Complete the prescription table. **Note:** Rate of Spread (ROS) is designated N/A because ignition patterns basically nullify ROS calculations.

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 6 – Smoke Management and Air Quality

Time 1 Hour

Objectives

1. Describe the relationship between smoke management and prescribed fire objectives.
2. Identify principal smoke management mitigation strategies.
3. Describe the steps for identifying smoke concerns and mitigation techniques for managing smoke production and dispersion.
4. Identify available tools and technologies that help develop the smoke management element of the prescribed fire plan.

Strategy

This unit discusses smoke management as it pertains to prescribed fire planning. Students learn how to identify smoke concerns, mitigation measures to be included in a plan, and the available tools and technologies associated with smoke management.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 1 and 2 of the Day 2 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Smoke Management Guide for Prescribed and Wildland Fire (student CD)

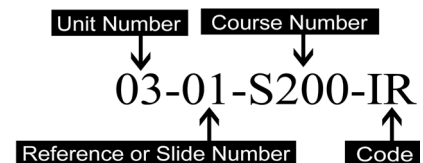
Outline

- I. Introduction
- II. Importance of Smoke Management
- III. Smoke as an Air Pollutant
- IV. Effects of Smoke on Visibility
- V. The Clean Air Act and Prescribed Fire
- VI. Identifying Conflicting Objectives
- VII. Smoke Management Strategies
- VIII. Plotting Downwind Concerns
- IX. Available Tools and Technologies

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 6 – Smoke Management and Air Quality

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	6-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	6-2-RX341-PPT
I. INTRODUCTION The following is summarized from the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide. Smoke Management and Air Quality: Describe how the project will comply with local community, county, state, tribal, and federal air quality regulations. The prescribed fire plan will identify: <ul style="list-style-type: none">• Class I air sheds• Restricted areas• Non-attainment areas (designated areas) and population centers that may be impacted.• Local sensitive features such as highways, airports, and recreation sites.• Other smoke sensitive receptors	6-3-RX341-PPT

OUTLINE	AIDS & CUES
<p>Include modeling outputs, and mitigation strategies and techniques to reduce the impacts of smoke production, if required by State Implementation Plans (SIPs) or other state or local regulations.</p> <p>For other smoke management planning suggestions and techniques for reducing or redistributing emissions, refer to the Smoke Management Guide for Prescribed and Wildland Fire (2001 Edition).</p>	
<p>II. IMPORTANCE OF SMOKE MANAGEMENT</p> <ul style="list-style-type: none"> • Smoke from prescribed fires will increasingly be regulated. • Public nuisance concerns • Transportation safety • Particulate standards are tightening due to scientific and medical study. • Potential liability • Local smoke violations may affect our ability to burn on a larger scale. • Many prescribed fire incidents are from smoke as opposed to escaped fire. 	6-4-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="285 283 764 321">B. Visibility in Scenic Areas</p> <ol style="list-style-type: none"> <li data-bbox="383 367 1122 1087"> <p data-bbox="383 367 1122 489">1. The 1977 Clean Air Act Amendments set forth a national goal for visibility that called for:</p> <ul style="list-style-type: none"> <li data-bbox="480 535 1122 793"> <p data-bbox="480 535 1122 793">• The prevention of any future, and the remedying of any existing impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution (CAA, Section 169(a)(1)).</p> <li data-bbox="480 835 1122 1087"> <p data-bbox="480 835 1122 1087">• Mandatory Class I Federal areas which include national parks and wilderness areas over certain sizes that were in existence as of August 7, 1977 (including any additions to those areas).</p> <li data-bbox="383 1134 1122 1392"> <p data-bbox="383 1134 1122 1392">2. Many people claim that viewing the scenery through clean, fresh air is one of the most important attributes of parks and wilderness areas. Smoke from prescribed fires can significantly affect the way the public is able to view the scenery.</p> <li data-bbox="383 1438 1122 1894"> <p data-bbox="383 1438 1122 1602">3. In 1999, the EPA issued regional haze regulations to manage and mitigate visibility impairment from the multitude of regional haze sources.</p> <p data-bbox="480 1648 1122 1894">Regional haze regulations call for states to establish goals for improving visibility in Class I national parks and wilderness areas and to develop long-term strategies for reducing emissions of air pollutants that cause visibility impairment.</p> 	

OUTLINE	AIDS & CUES
<p data-bbox="285 281 737 321">C. Highway Safety Effects</p> <p data-bbox="380 367 1102 489">Prescribed fire smoke, with and without fog, has been responsible for a number of safety-related accidents and fatalities.</p> <p data-bbox="380 535 1081 747">When relative humidity is at approximately 70-80%, wood smoke particles act as condensation nuclei and can enhance the development of fog, which presents significant safety problems on highways.</p> <p data-bbox="190 793 1062 831">V. THE CLEAN AIR ACT AND PRESCRIBED FIRE</p> <p data-bbox="285 877 1081 961">The Clean Air Act (as amended in 1990) is a legal system designed to protect human health and welfare.</p> <p data-bbox="285 1008 1068 1134">The Clean Air Act establishes and attains major air quality goals by addressing existing and potential air pollution problems.</p> <p data-bbox="285 1180 753 1218">Major air quality goals include:</p> <ul data-bbox="285 1264 1123 1688" style="list-style-type: none"> <li data-bbox="285 1264 1110 1348">• Attaining National Ambient Air Quality Standards (NAAQS). <li data-bbox="285 1394 1123 1478">• Preventing significant deterioration of air quality in areas cleaner than the NAAQS. <li data-bbox="285 1524 971 1608">• Protecting visibility in national parks and wilderness areas. <li data-bbox="285 1654 1078 1688">• Preventing harmful levels of toxic air pollutants. <p data-bbox="190 1734 1127 1818">ASK STUDENTS WHAT STATE REGULATIONS THEY MUST COMPLY WITH.</p>	<p data-bbox="1159 793 1406 831">6-8-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>A. State Implementation Plans</p> <p>Each state is responsible for preparing an SIP, and if necessary, a smoke management plan to prevent deterioration of air quality and NAAQS violations.</p> <p>A state may adopt and enforce standards and regulations that are more (but never less) stringent than those required by the Clean Air Act.</p> <p>Certain states may have certain standards for toxic air pollutants. Prescribed fire practitioners should provide input to state regulators when the state is developing or revising their SIP.</p>	6-9-RX341-PPT
<p>B. Federal Agency Compliance</p> <p>In general, any federal facility or authorized activity emitting air pollution, including a program of prescribed burning, must comply with all federal, state, interstate or local requirements to the same extent as it applies to any non-governmental entity.</p> <p>Consequently, a federal agency may have to obtain permits, monitor impacts, reduce emissions, pay fees, and keep records, etc.</p> <p>A federal agency must also not engage in, support in any way, license, or approve any activity, such as prescribed fire, which does not meet all applicable requirements of a state implementation plan.</p>	6-10-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> – A separate and distinct set of smoke management objectives should be stated in the prescribed fire plan together with the production/duration prescription parameters to accomplish these objectives. • Two examples of prescribed fire objectives that appear to conflict with the guidance for good smoke management: <ul style="list-style-type: none"> – Example 1: The prescribed fire is being done for silviculture site preparation; extensive duff reduction is a goal. Smoke management guidelines say to minimize the smoldering phase. – Example 2: The prescribed fire is an understory burn for hazard reduction, but the scorch on the residual trees must be strictly limited. Smoke management guidance is to burn with the highest intensity possible to develop a strong convection column. <p>DISCUSS THE CONFLICTING OBJECTIVES AND HOW TO PRIORITIZE. DISCUSS POSSIBLE WAYS TO MEET BOTH OBJECTIVES OR DECIDE WHICH OBJECTIVE HAS THE HIGHEST PRIORITY.</p>	<p>6-14-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="284 281 506 317">B. Dilution</p> <p data-bbox="380 367 1092 491">Controls the rate or scheduling for dispersion to assure a tolerable concentration of smoke in designated areas.</p> <ol style="list-style-type: none"> <li data-bbox="380 537 1092 829"> <p data-bbox="380 537 1092 615">1. Burn when weather systems are unstable, but not at extremes.</p> <p data-bbox="475 665 1114 829">Avoid burning below the inversion layer. A temperature inversion can isolate smoke originating above the stable layer from areas below the inversion.</p> <li data-bbox="380 879 1125 1129"> <p data-bbox="380 879 1073 1003">2. Start ignitions in the morning/early afternoon. As atmospheric heating takes place, mixing will usually improve.</p> <p data-bbox="475 1054 1125 1129">Avoid late afternoon and evening ignitions because of increasing atmospheric stability.</p> <li data-bbox="380 1180 1086 1346"> <p data-bbox="380 1180 1086 1346">3. Rotate burning opportunities between air sheds to avoid overloading natural clearance mechanisms or consecutive impacts on the same areas or drainages.</p> <li data-bbox="380 1396 1063 1688"> <p data-bbox="380 1396 1063 1520">4. Establish firing patterns and tools to generate adequate heat to penetrate low level stable areas.</p> <p data-bbox="475 1570 1040 1688">Consider pre-burning of control lines (blacklining) to allow for hotter firing techniques.</p> <li data-bbox="380 1738 1133 1862"> <p data-bbox="380 1738 1133 1862">5. Avoid days with low morning transport wind speed. Use test fire or helium balloons to measure transport winds at the burn site.</p> 	<p data-bbox="1157 281 1425 317">6-17-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="380 281 976 321">6. Be cautious of nighttime burning.</p> <ul data-bbox="477 365 1081 617" style="list-style-type: none"> <li data-bbox="477 365 704 405">• Inversions <li data-bbox="477 449 761 489">• Fog formation <li data-bbox="477 533 1081 617">• Consider down slope, down canyon nighttime circulation. <p data-bbox="380 661 1052 785">7. Collect pre-burn meteorological information on site to understand local weather. Use spot weather forecasts.</p> <p data-bbox="284 829 683 869">C. Emission Reduction</p> <p data-bbox="380 913 1084 1037">Uses techniques to minimize the smoke output per unit area treated. This should be considered on all burns.</p> <p data-bbox="380 1081 1013 1121">1. Reduce the number of acres burned.</p> <p data-bbox="477 1165 1097 1289">The fewer acres burned, the fewer emissions produced. This may not always be a preferred option.</p> <p data-bbox="477 1333 1105 1541">Reducing the number of acres burned may result in only delaying the release of emissions, either through prescribed burning at a later date, or as a result of a wildfire.</p>	<p data-bbox="1157 829 1422 869">6-18-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>2. Reduce pre-burn fuel loading.</p> <p>Reducing the fuel loading reduces the available fuel for consumption during the burn.</p> <p>Accomplished by:</p> <ul style="list-style-type: none"> • Burn outside active growing season. • Burn soon after harvest. • Burn frequently, if appropriate. <p>3. Reduce fuel consumption.</p> <p>This refers to reducing the proportion of biomass that is actually burned. The objective is to burn only the biomass that needs to be burned.</p> <p>Under higher fuel moisture conditions, combustion is less efficient; however, much less fuel is consumed and the total emissions produced are lower than under lower fuel moisture conditions.</p> <p>THE FOLLOWING SECTION IS INTENDED FOR IGNITION TECHNIQUES AS THEY RELATE TO SMOKE.</p>	
<p>4. Ignition techniques</p> <p>Using different ignition techniques can lower the total emissions produced from burns.</p>	6-19-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Pile burning <ul style="list-style-type: none"> – More fuels within piles burn during the flaming phase which has a lower emission factor. – Pile burns allow for burning outside primary burning season. – Burn piles when dry. – Burn clean with low mineral soil content. – Cover piles to keep dry to allow for late season burning. • Backing fires <ul style="list-style-type: none"> – Backing fires consume dead fuels more completely. – Typically produces less smoke per unit of time. • Head fire (high intensity) <ul style="list-style-type: none"> – Generally less consumption of fuel. – Typically produces more smoke per unit of time. – Aerial ignition can create high intensity, short duration fires, reducing the fuel consumed during smoldering phase. 	

OUTLINE	AIDS & CUES
<p>3. Locate burn on map and draw a line representing the centerline of the path of the smoke plume for the distance indicated (direction of transport wind).</p> <p>If burn will last three hours or more, or will be burning/smoldering through the night, draw another line showing predicted wind direction at completion of burn.</p> <p>4. To allow for horizontal dispersion of smoke, as well as shifts in wind direction, draw two other lines from the fire at an angle of 30 degrees from the centerline(s).</p> <p>The results of these plots are your probable daytime smoke impact area(s).</p> <p>5. Identify possible nighttime smoke pooling areas or drift directional changes due to topography.</p>	<p>6-22-RX341-PPT</p>
<p>B. Step 2 - Identify Smoke Receptors</p> <p>1. Identify and mark on the map any receptors such as airports, highways, communities, recreation areas, schools, hospitals and factories within the 30 degree lines plotted above. These are potential targets for smoke from your burn.</p> <p>2. If no potential targets are found, you may burn as prescribed. Keep in mind the permit process as well as the prescribed fire plan.</p> <p>3. If any targets are found, continue this screening system.</p>	<p>6-23-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>3. If any critical impact receptors are located:</p> <ul style="list-style-type: none"> • Amend prescription to identify a new wind direction that will avoid such areas, and return to Step 1, or • Apply a smoke management strategy that would negate adverse impacts to the critical receptors (coordinate with your respective state/local air resource manager), or • Reduce the size of the area to be burned, and aggressively mop up and monitor, or • Work with affected individuals, etc., to come up with mitigation measure(s), or • Use an alternative other than burning. <p>4. If no critical impact receptors are found, or smoke problem has been mitigated, continue the screening system.</p>	<p>6-26-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="284 281 764 321">D. Step 4 - Mitigate the Risk</p> <p data-bbox="380 367 1117 535">When any receptor may be impacted by your burn, meet smoke management obligations by mitigating or minimizing possible adverse effects by doing some or all of the following:</p> <ol data-bbox="380 581 1130 1472" style="list-style-type: none"> <li data-bbox="380 581 1065 663">1. Prescribe a new wind direction to avoid receptors. <li data-bbox="380 709 1089 831">2. If you cannot avoid all targets, review whether the burn can be accomplished or not. <li data-bbox="380 877 992 959">3. Apply a different smoke modeling technique. <li data-bbox="380 1005 1062 1087">4. Keep smoldering phase of the burn to a short period of time. <li data-bbox="380 1134 1130 1215">5. Look for atmospheric conditions that are on the high end for good dispersion. <li data-bbox="380 1262 1105 1344">6. Look for good transport winds (10 mph or greater). <li data-bbox="380 1390 1125 1472">7. Public relations work (notify various media sources, public education). <p data-bbox="380 1518 1094 1686">If impact receptors in the overlapping trajectory are from two sources of smoke, reschedule or look closely at the combined effects of the two prescribed fires.</p> <p data-bbox="380 1732 1094 1814">Interagency coordination and prioritization may be required.</p>	<p data-bbox="1157 281 1425 321">6-27-RX341-PPT</p> <p data-bbox="1157 1005 1425 1045">6-28-RX341-PPT</p> <p data-bbox="1157 1518 1425 1558">6-29-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="188 281 1008 317">IX. AVAILABLE TOOLS AND TECHNOLOGIES</p> <p data-bbox="284 367 1125 449">The intent of this class is NOT to teach modeling programs, but identify those that could possibly be used.</p> <ul style="list-style-type: none"> <li data-bbox="284 497 1125 579">• Smoke dispersion and emissions prediction systems are valuable tools in smoke management. <ul style="list-style-type: none"> <li data-bbox="357 625 1036 707">– Aid in visualizing what fuel and weather conditions are best suited for burning. <li data-bbox="357 753 1081 835">– Can be used as communications tool to help describe potential impacts. <li data-bbox="284 882 1062 1003">• Emission prediction programs can calculate the consumption of fuel and emission of particles produced by wildland fire. <ul style="list-style-type: none"> <li data-bbox="357 1050 1081 1087">– Fire Emission Production Simulator (FEPS) <li data-bbox="357 1134 1040 1171">– First Order Fire Effects Model (FOFEM) <li data-bbox="357 1218 1078 1299">– Simple Approach Smoke Estimation Model (SASEM) <li data-bbox="357 1346 570 1383">– Consume 	<p data-bbox="1159 879 1422 915">6-30-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>A. Three Types of Smoke Trajectory Models</p> <p>1. Dispersion models – Track trajectories of individual particles or assume a pattern of diffusion.</p> <p>Plume and puff dispersion patterns are modeled:</p> <ul style="list-style-type: none"> • Plume models – Assume that smoke travels in a straight line under steady state conditions. <ul style="list-style-type: none"> – SASEM – VSMOKE – VSMOKE GIS <p>Plume models are most commonly applied in flat or gently rolling terrain, but can be used whenever a plume is expected or desired to rise above the influence of the terrain.</p> • Puff models – Simulate a continuous plume by rapidly generating a series of puffs. <ul style="list-style-type: none"> – TSARS – CALPUFF <p>Some states require that smoke dispersion modeling be completed for smoke permits.</p> 	<p>6-31-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>2. Box models – Assume instantaneous mixing within a confined area such as a basin or valley.</p> <p>Flow is assumed to be down valley and smoke is assumed to fill each box segment.</p> <p>This method of estimating smoke concentrations is most useful when understanding patterns of smoke concentrations in an isolated valley is critical. ValBox is the most common box model.</p>	6-32-RX341-PPT
<p>3. Grid models – Use a fixed coordinate system that allows for evaluation of cumulative impacts from several plumes or chemical interactions of particles and gases within plumes.</p> <p>Grid models are especially useful for evaluating the impact of smoke on regional haze.</p> <p>At present, grid models are not being used for wildland fire applications.</p>	6-33-RX341-PPT
<p>B. Web Sites with Modeling Programs and User Guides</p> <p>1. Fire Research and Management Exchange System (FRAMES): http://frames.nbii.gov (click on the “Subject Areas” tab then the “Emissions and Smoke” link)</p> <p>2. Additional links to smoke management information: www.nwcg.gov</p>	6-34-RX341-PPT

OUTLINE	AIDS & CUES
<p>CLASS DISCUSSION:</p> <ul style="list-style-type: none"> • Refer students to the Smoke Management element, Prescription element, and Smoke Vector map in the Red Bull Prescribed Fire Plan. • Discuss all prescribed fire plan elements that the smoke element may need to be linked to in their project. • Ask students, “Would this be adequate for your area?” • Instructors should provide examples from personal experience for Element 19. <p><u>End of Discussion.</u></p>	<p>6-35-RX341-PPT</p>
<p>REVIEW UNIT OBJECTIVES.</p>	<p>6-36-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 7A – Implementation: Pre-burn Considerations and Briefing

Time 30 Minutes

Objectives

1. Identify on- and offsite actions that must be completed and documented prior to implementation.
2. Identify considerations that must be addressed in the prescribed fire plan.
3. Identify actions, timelines, and responsibilities for interagency and intra-agency coordination and public notifications.
4. Identify briefing criteria to be covered in the prescribed fire plan.

Strategy

This unit covers several topics including actions that must be completed and documented prior to implementation. Briefing elements are also covered.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Interagency Helicopter Operations Guide (optional)
- ☐ Interagency Aerial Ignitions Guide (optional)

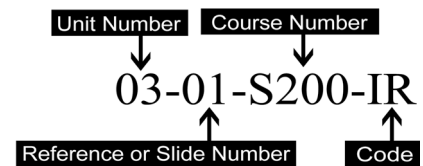
Outline

- I. On- and Offsite Actions that must be Completed and Documented to Implement the Burn
- II. Pre-Burn Considerations
- III. Actions, Timelines, and Responsibilities for Interagency and Intra-Agency Coordination and Public Involvement
- IV. Briefing Criteria

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7A – Implementation: Pre-burn Considerations and Briefing

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7A-1-RX341-PPT
PRESENT LESSON OBJECTIVES.	7A-2-RX341-PPT
I. ON- AND OFFSITE ACTIONS THAT MUST BE COMPLETED AND DOCUMENTED TO IMPLEMENT THE BURN	
Where might you identify pre-burn considerations?	7A-3-RX341-PPT
Preliminary complexity analysis, NEPA, site visit.	
A. Special Onsite Clearances	7A-4-RX341-PPT
<ul style="list-style-type: none">• Archeological• Biological• Private landowner agreements	
B. Fireline Preparation Needs	
<ul style="list-style-type: none">• Snags• Fireline standards• Mowing, plowlines, handlines• Natural barriers (creeks or swamps)• Difficult holding areas• Other	

OUTLINE	AIDS & CUES
<p>C. Pre-Positioning of Equipment</p> <ul style="list-style-type: none"> • Portable pumps, tanks, hose • Fuel • Smoke signs • Weather stations • Fuel sticks • Repeaters • Tools • Drinking water and/or food • Drop-point signs • Miscellaneous supplies • Other <p>D. Other Offsite Considerations</p> <ul style="list-style-type: none"> • Notifications • Signing • Logistical considerations • Staging/helispot/safety zone construction • Vehicle ingress/egress issues 	

OUTLINE	AIDS & CUES
<p data-bbox="188 281 800 317">II. PRE-BURN CONSIDERATIONS</p> <p data-bbox="284 367 505 403">A. Hazards</p> <ul data-bbox="380 453 1104 871" style="list-style-type: none"> <li data-bbox="380 453 857 489">• Fence posts or power lines. <li data-bbox="380 537 1088 573">• Tires or other hazardous materials in units. <li data-bbox="380 621 959 657">• Identification of hazards on maps. <li data-bbox="380 705 1104 789">• Unexploded ordnance on historic or current military training sites. <li data-bbox="380 837 537 873">• Other <p data-bbox="284 921 1062 999">B. Protection of Areas of Critical Environmental Concern</p> <ul data-bbox="380 1050 1062 1425" style="list-style-type: none"> <li data-bbox="380 1050 649 1085">• Nesting trees <li data-bbox="380 1134 667 1169">• Riparian areas <li data-bbox="380 1218 1062 1253">• Threatened and endangered habitat areas <li data-bbox="380 1302 708 1337">• Wilderness areas <li data-bbox="380 1386 537 1421">• Other <p data-bbox="284 1470 768 1505">C. Onsite Weather and Fuels</p> <ul data-bbox="380 1556 1088 1806" style="list-style-type: none"> <li data-bbox="380 1556 1088 1640">• Identify the frequency and type of weather observations in the plan. <li data-bbox="380 1688 1032 1724">• Acquire spot or area weather forecasts. <li data-bbox="380 1772 911 1808">• Fuel moisture sampling onsite. 	<p data-bbox="1159 281 1433 317">7A-5-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="191 283 1096 405">III. ACTIONS, TIMELINES, AND RESPONSIBILITIES FOR INTERAGENCY AND INTRA-AGENCY COORDINATION AND PUBLIC INVOLVEMENT</p> <p data-bbox="285 457 1062 573">Develop a notification list specific to the project's implementation process to address public safety and concerns.</p> <p data-bbox="285 625 641 663">The list should identify:</p> <p data-bbox="285 709 948 747">A. Who will be Responsible for Contacts</p> <ul data-bbox="380 793 1019 919" style="list-style-type: none"> • Ability to delegate this responsibility? • Lowest level of delegation? <p data-bbox="285 966 925 1003">B. Documentation Needed for Contacts</p> <ul data-bbox="380 1050 1117 1434" style="list-style-type: none"> • Requirements (who, when, time) • Before (time prior, such as 24 hours, 2 weeks, etc.) • After (When declared out? Open to public?) • Where this may be placed (project file, dispatch?) 	<p data-bbox="1162 283 1433 321">7A-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Contacts for Prescribed Fire</p> <ul style="list-style-type: none"> • Can or may get this information from: <ul style="list-style-type: none"> – Other established communications plan(s) (external affairs/public affairs) – Other prescribed fire plans – FMP – Dispatch – Front desk • May include, but not limited to: <ul style="list-style-type: none"> – Agency personnel/positions (Agency Administrator, supervisor's office/ regional office, front desk personnel). – Adjacent or potential affected federal, state, county, local, and Tribal agencies. – Air quality or smoke management agencies. • Local or potential impacted publics: <ul style="list-style-type: none"> – Homeowners – Businesses – Airports – Radio stations – Television market 	

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> – Newspapers – Phone trees – Internet sites – Local fire sites – Local agency site – Community boards or Web sites – Local topic blog pages <p>Remember to update fire status information on Web sites, radio blurbs, and automatic phone messages, and to take the information off when complete (if longer than one operational shift, or as needed).</p>	
<p>IV. BRIEFING CRITERIA</p> <p>THE GO/NO-GO CHECKLISTS WILL BE COVERED IN DETAIL IN UNIT 11.</p> <p>The briefing checklist (required) should list briefing topics only, not re-state what is listed in the prescribed fire plan for that element.</p>	7A-7-RX341-PPT
<ul style="list-style-type: none"> • Burn organization and assignments • Burn objectives and prescription • Description of the prescribed fire area • Expected weather and fire behavior • Communications 	7A-8-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Ignition plan (firing sequence(s)) • Contingency plan and assignments • Wildfire conversion • Safety and medical plan <p>An Incident Action Plan (IAP) is optional, but may be required per agency policy. An IAP is recommended for large multi-day or high complexity prescribed fires.</p> <p>If aerial ignition devices will be used, include an Aerial Ignition Operation Job Hazard Analysis (for assistance with this topic, consult aviation staff).</p> <p>Additional reference material:</p> <ul style="list-style-type: none"> • Interagency Helicopter Operations Guide, NFES 1885 • Interagency Aerial Ignition Guide, NFES 1080 <p>CLASS DISCUSSION: Refer students to the Red Bull Prescribed Fire Plan. Discuss elements 9 and 10.</p> <p>REVIEW LESSON OBJECTIVES.</p>	<p>7A-9-RX341-PPT</p> <p>7A-10-RX341-PPT</p>

UNIT OVERVIEW

Course	Prescribed Fire Plan Preparation, RX-341
Unit	7B – Implementation: Organization and Equipment
Time	30 Minutes

Objectives

1. Identify appropriate resources, or resources capabilities, equipment, and organization necessary to implement the prescribed fire plan.
2. Identify required staffing qualifications based on prescribed fire complexity.

Strategy

This unit provides students with skills to identify the appropriate kind and type of resources and equipment necessary to implement a prescribed fire. Identifying appropriate overhead positions and building some flexibility into the plan are key elements.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 3 and 4 of the Day 2 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Fireline Handbook or IRPG
- ☐ The instructor may provide tools or methods used locally to calculate staffing requirements.

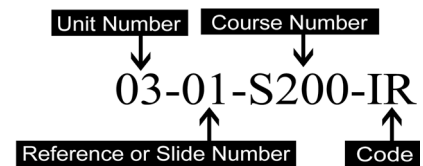
Outline

- I. Resource Capabilities and Organization
- II. Staffing Qualifications and Complexity

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7B – Implementation: Organization and Equipment

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7B-1-RX341-PPT
PRESENT LESSON OBJECTIVES.	7B-2-RX341-PPT
I. RESOURCES, CAPABILITIES, AND ORGANIZATION The type and kind of organization and equipment used to safely and efficiently implement a prescribed fire can affect the written plan and implementation through nearly all the elements.	7B-3-RX341-PPT
A. The complexity of each prescribed fire determines the organization capabilities needed to: <ul style="list-style-type: none">• Safely achieve the objectives specified in the prescribed fire plan.• Hold the prescribed fire within the project boundary or burn unit boundary.	7B-4-RX341-PPT
B. Specify the minimum required implementation organization to meet the capabilities by position and equipment. A prescribed fire burn boss will be assigned to every prescribed fire. Some positions may not be filled as collateral duty.	7B-5-RX341-PPT

OUTLINE	AIDS & CUES
<p>Example: For moderate or high complexity prescribed fires, burn bosses may not function as firing and holding bosses. These positions must be identified in the plan.</p> <p>The plan may specify capabilities required rather than type of equipment/personnel, such as line building production rates of a hand crew vs. engines (either may be acceptable).</p> <p>Specify the supplies needed for the duration of the prescribed fire until declared out.</p> <p>C. Design the organization and equipment plan to meet the operational needs of the prescribed fire.</p> <ol style="list-style-type: none"> 1. Understand how the prescribed fire plan element links with ignition and holding operations. 2. Examine specific operational criteria for ignition and holding. <ul style="list-style-type: none"> • Goals and objectives • Prescription • Contingency • Smoke <p>How does the organization and equipment element relate to the ignition, holding, and contingency elements of the Red Bull Prescribed Fire Plan?</p> <p>REFER STUDENTS TO THE RED BULL PRESCRIBED FIRE PLAN. DISCUSS ELEMENTS 11, 15, 16, AND 17.</p>	<p>7B-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>3. Determine holding resource needs.</p> <p>In the plan, identify resources needed for the prescribed fire project based on their capabilities.</p> <p>Identify the needs for holding critical areas and sensitive resource locations.</p> <p>The capabilities of the holding resources must be adequate to meet the prescribed fire holding plan objectives and <u>should be determined by the capacity at the highest fire behavior.</u></p> <p>4. Where can you find production rates and capabilities?</p> <ul style="list-style-type: none"> • Hauling chart • BEHAVE Size, Contain programs • Fireline Handbook/IRPG <p>5. Determine additional resource needs to be onsite. A project may require some specialized technical expertise to address concerns.</p> <ul style="list-style-type: none"> • Monitors <ul style="list-style-type: none"> – Smoke emissions. – LTAN for long-duration prescribed fires. • Education mitigation specialist or public information officer. • Resource advisor. 	

OUTLINE	AIDS & CUES
<p data-bbox="381 283 1133 409">6. Organizations should be flexible and adhere to standard ICS fire management principles.</p> <p data-bbox="475 455 1076 619">The organization should contain what is needed to implement the plan safely and efficiently during all phases of the prescribed fire.</p> <p data-bbox="475 665 1092 749">Different organizations may be identified for different stages of implementation.</p> <ul style="list-style-type: none"> <li data-bbox="475 795 670 837">• Holding <li data-bbox="475 884 824 926">• Mop-up and patrol <li data-bbox="475 972 971 1014">• Different ignition operations <li data-bbox="475 1060 1125 1732"> <ul style="list-style-type: none"> <li data-bbox="548 1136 1039 1262">– May require identifying and developing multiple organizations. <li data-bbox="548 1308 1125 1472">– For example, the plan may call for a large, highly qualified group (either initially or under high end prescriptions). <li data-bbox="475 1518 1112 1732">• Based on conditions (or as a large project or a multiple unit project progresses), the plan may identify the ability to downgrade to a smaller, less complex organization. 	

OUTLINE	AIDS & CUES
<p>7. The equipment used to implement a project can change the characteristics of the project.</p> <ul style="list-style-type: none"> • Consider writing the plan with the flexibility to accommodate changes. <ul style="list-style-type: none"> – Include the type and number of ignition devices and fuel needed. – Identify the type and amount of holding equipment. • Aerial ignition requires specialized equipment and organization with specialized qualifications. <ul style="list-style-type: none"> – An aerial ignition plan – Air operations plan – Special use safety plan – Aviation project plan <p><u>Remember:</u> Identify support equipment needed, especially on multiple-day projects in remote areas. May need to use a logistics or camp manager.</p>	

OUTLINE	AIDS & CUES
<p data-bbox="188 281 1122 317">II. STAFFING QUALIFICATIONS AND COMPLEXITY</p> <p data-bbox="285 367 500 403">A. Staffing</p> <p data-bbox="380 453 1104 573">On prescribed fires with large organizations, use the ICS organization and staffing commensurate with the level of complexity.</p> <p data-bbox="380 623 1083 701">Consider using a prescribed fire manager when conducting multiple prescribed fires.</p> <p data-bbox="285 751 591 787">B. Qualifications</p> <p data-bbox="380 837 1133 915">The complexity of each prescribed fire or phase of fire(s):</p> <ul data-bbox="380 966 1133 1213" style="list-style-type: none"> <li data-bbox="380 966 1062 1085">• Helps determine the organizational qualifications needed to safely ignite and hold the prescribed fire. <li data-bbox="380 1136 1133 1213">• Ensures objectives specified in the prescribed fire plan are achieved. <p data-bbox="380 1264 1112 1383">Some positions on certain prescribed fires may not allow trainees. This should be documented in the plan organization.</p> <p data-bbox="380 1434 1122 1554">Reference Table 1 of “The Guide” (page 9) to determine position needs related to the prescribed fire complexity.</p> <p data-bbox="188 1604 1086 1682">DISCUSS THE QUALIFICATIONS REQUIREMENTS RELATED TO PRESCRIBED FIRE COMPLEXITY.</p>	<p data-bbox="1159 281 1430 317">7B-7-RX341-PPT</p> <p data-bbox="1159 751 1430 787">7B-8-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>Upon implementation (all stages) of the prescribed fire, documentation in the form of an organization chart must be completed.</p> <p>Be sure that more than one blank organization chart is included in the project file or is available for the burn boss.</p>	7B-9-RX341-PPT
REVIEW LESSON OBJECTIVES.	7B-10-RX341-PPT

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 7C – Implementation: Test Fire and Ignition Plan

Time 1 Hour

Objectives

1. Describe the test fire process and documentation requirements.
2. Describe ignition strategies used to meet fire behavior objectives and control limitations.

Strategy

This unit provides direction for completing the test fire and ignition planned elements of the prescribed fire plan. The material in this unit can be tied to other units in the course including objectives. The instructor should have a sound knowledge of firing techniques.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan

Exercise

- Ignition Sequence (page 7C.15)

Evaluation Method

- Day 2 Quiz (make one copy per student; located in Appendix D).

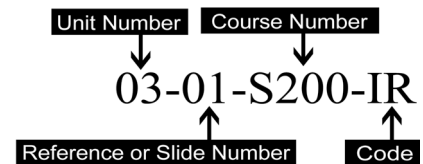
Outline

- I. Test Fire
- II. Ignition Plan

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7C – Implementation: Test Fire and Ignition Plan

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7C-1-RX341-PPT
PRESENT LESSON OBJECTIVES.	7C-2-RX341-PPT
I. TEST FIRE	7C-3-RX341-PPT
REFER STUDENTS TO THE RED BULL PRESCRIBED FIRE PLAN. DISCUSS ELEMENT 14.	
A. Provisions	
Every prescribed fire will have a test fire ignited before main project area ignition operations take place.	
Provisions for a test fire must be provided in the prescribed fire plan.	
The purpose of the test fire is to verify that the fire behavior will achieve the fire management, resource management and smoke management objectives.	
The test fire provisions are linked to many elements within the prescribed fire plan:	
<ul style="list-style-type: none">• Prescribed fire objectives• Constraints• Prescription and environmental guidelines	

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Expected fire behavior • Smoke management • Ignition and holding • Mopup and patrol <p>B. Location and Size</p> <p>Identify the size and where the test fire will be ignited.</p> <p>The test fire must be ignited in a representative location and in an area where the fire can be easily controlled or suppressed if needed.</p> <p>The size of the test fire should be determined by the fuel types and objectives of the prescribed fire.</p> <p>Examples:</p> <ul style="list-style-type: none"> • A project may have a single fuel type such as grass, but high winds are needed; a small test fire area next to a good barrier may need to be utilized. • A project with more than one fuel type or where blackline operations are in different fuels may need to have test fire ignited in a larger area or small individual test fires within each fuel type. 	<p>7C-4-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Test Fire Documentation</p> <p>The prescribed fire plan requires test fire documentation. Provisions for documenting the results of the test fire include:</p> <ul style="list-style-type: none"> • Location of the test fire(s) • Date and time • Fuels • Weather conditions onsite • Results (flame length, rate of spread, smoke dispersal, resource effects) • Does the test fire meet the prescription parameters? (Yes/No) • Results documentation is normally put on the Unit Log or Go/No-Go Checklist. 	7C-5-RX341-PPT
<p>D. Multiple-Day Projects</p> <p>On multiple-day projects, evaluation of current active fire behavior, in lieu of a test fire, may provide a comparative basis for continuing and must be documented.</p>	7C-6-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="188 281 558 317">II. IGNITION PLAN</p> <p data-bbox="284 367 1068 449">All prescribed fire projects, or units within a project, must have a description of the ignition procedures.</p> <p data-bbox="284 495 1073 577">It is important to provide flexibility for the burn boss and ignition specialist to accomplish objectives.</p> <p data-bbox="284 623 813 663">A. Developing the Ignition Plan</p> <p data-bbox="380 709 1110 833">When developing the ignition plan, avoid wording and specific details that limits the options for burn personnel—allow for flexibility.</p> <ol style="list-style-type: none"> <li data-bbox="380 879 1097 1262">1. Ignition plan may include: <ul style="list-style-type: none"> <li data-bbox="475 968 776 1003">• Firing methods <li data-bbox="475 1010 667 1045">• Devices <li data-bbox="475 1052 721 1087">• Techniques <li data-bbox="475 1094 708 1129">• Sequences <li data-bbox="475 1136 1073 1171">• Anticipated patterns and sequences <li data-bbox="475 1178 1097 1213">• Absolute patterns (only if necessary) <li data-bbox="475 1220 789 1255">• Ignition staffing <li data-bbox="380 1308 1110 1772">2. Because the prescription is driven by fire behavior, the ignition tactics and procedures play a key role in meeting prescription parameters and the prescribed fire plan objectives. <ul style="list-style-type: none"> <li data-bbox="475 1566 964 1648">• What are the prescribed fire objectives? <li data-bbox="475 1692 1078 1772">• What fire behavior will accomplish those objectives? 	<p data-bbox="1146 281 1419 317">7C-7-RX341-PPT</p> <p data-bbox="1146 879 1419 915">7C-8-RX341-PPT</p> <p data-bbox="1146 1308 1419 1344">7C-9-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • What ignition pattern, technique, and application type will produce the desired fire behavior? • Are the tools needed to gain the desired fire behavior available? <p>3. If blacklines are needed, consider and identify blackline location and size standards.</p> <ul style="list-style-type: none"> • Will it be allowed to burn into the unit? • Will moisture of extinction be used? • Will it be burned under a different prescription? <p>4. Consider the relation of ignition to holding. It is very easy to design an ignition plan that when implemented will outpace the holding forces capabilities.</p> <p>5. Maps may be needed to show:</p> <ul style="list-style-type: none"> • Proposed or required firing patterns. • Areas where special ignition techniques or operations need to be completed. • Areas of constraints or limitations. 	

OUTLINE	AIDS & CUES
<p>6. Multiple prescriptions may require identifying and developing multiple ignition operations and organizations to ignite the prescribed fire. This will most likely affect the holding and contingency plan(s) as well.</p> <p>7. If aerial ignition (or other aerial operations) is planned, cover aviation operations, organization, and safety within the prescribed fire plan and aerial ignition plan, or reference an agency-specific aviation operating plan.</p> <p>CLASS DISCUSSION:</p> <p>Discuss specific ignition instructions to meet multiple objectives within the burn site. For example:</p> <ul style="list-style-type: none"> • Expand or contract spacing between head fire strips to increase or decrease fire behavior. • Ignite upslope of regeneration patches, allowing the fire to back downhill through the patch. <p><u>End Discussion.</u></p>	

OUTLINE	AIDS & CUES
<p data-bbox="285 281 678 321">B. Ignition Techniques</p> <p data-bbox="380 365 1013 447">Various ignition techniques can be used to accomplish prescribed fire objectives.</p> <p data-bbox="188 491 1032 615">IT IS CRITICAL TO EXPLAIN RATIONALE FOR CHOOSING FIRING TECHNIQUES. DISCUSS ASSOCIATED RISKS AND BENEFITS.</p> <p data-bbox="188 659 1105 827">THE FOLLOWING EXPLAINS THE APPLICATION OF IGNITION TECHNIQUES TO PRESCRIBED FIRE. ALLOT TIME AS APPROPRIATE FOR STUDENT EXPERIENCE LEVELS.</p>	<p data-bbox="1146 281 1438 321">7C-10-RX341-PPT</p>
<p data-bbox="380 879 662 919">1. Backing fire</p> <p data-bbox="474 963 1083 1129">A backing fire is started along a baseline or anchor point (such as a road, stream, blackline or some other barrier) and allowed to back into the wind.</p> <ul data-bbox="474 1173 1029 1560" style="list-style-type: none"> <li data-bbox="474 1173 850 1213">• Minimizes intensity. <li data-bbox="474 1257 846 1297">• Slow burn progress. <li data-bbox="474 1341 1016 1423">• Not flexible to changes in wind direction. <li data-bbox="474 1467 1029 1560">• Requires good fuel continuity to propagate ignition. 	<p data-bbox="1146 879 1438 919">7C-11-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="380 281 690 321">2. Strip head fire</p> <p data-bbox="475 367 1089 489">A line of fire or series of lines are ignited at determined locations or the edge of a barrier.</p> <p data-bbox="475 535 1089 705">The lines of fire must be ignited in such a way that each ignited strip will result in flame lengths and fire intensities within the prescription parameters.</p> <ul data-bbox="475 751 1089 1472" style="list-style-type: none"> <li data-bbox="475 751 1089 791">• Allows for wide range of intensities. <li data-bbox="475 837 1089 877">• Flame length is the prime criteria. <li data-bbox="475 924 1089 1136">• Distance between strips must be adjusted constantly for changes in stand density, size and crown base of leave trees, fuels continuity and arrangement, and weather conditions. <li data-bbox="475 1182 1089 1222">• Most widespread ignition method. <li data-bbox="475 1268 1089 1350">• Quick ignition and burnout of the project or unit. <li data-bbox="475 1396 1089 1472">• Allows for accommodating moderate wind shifts. 	<p data-bbox="1146 281 1435 321">7C-12-RX341-PPT</p>

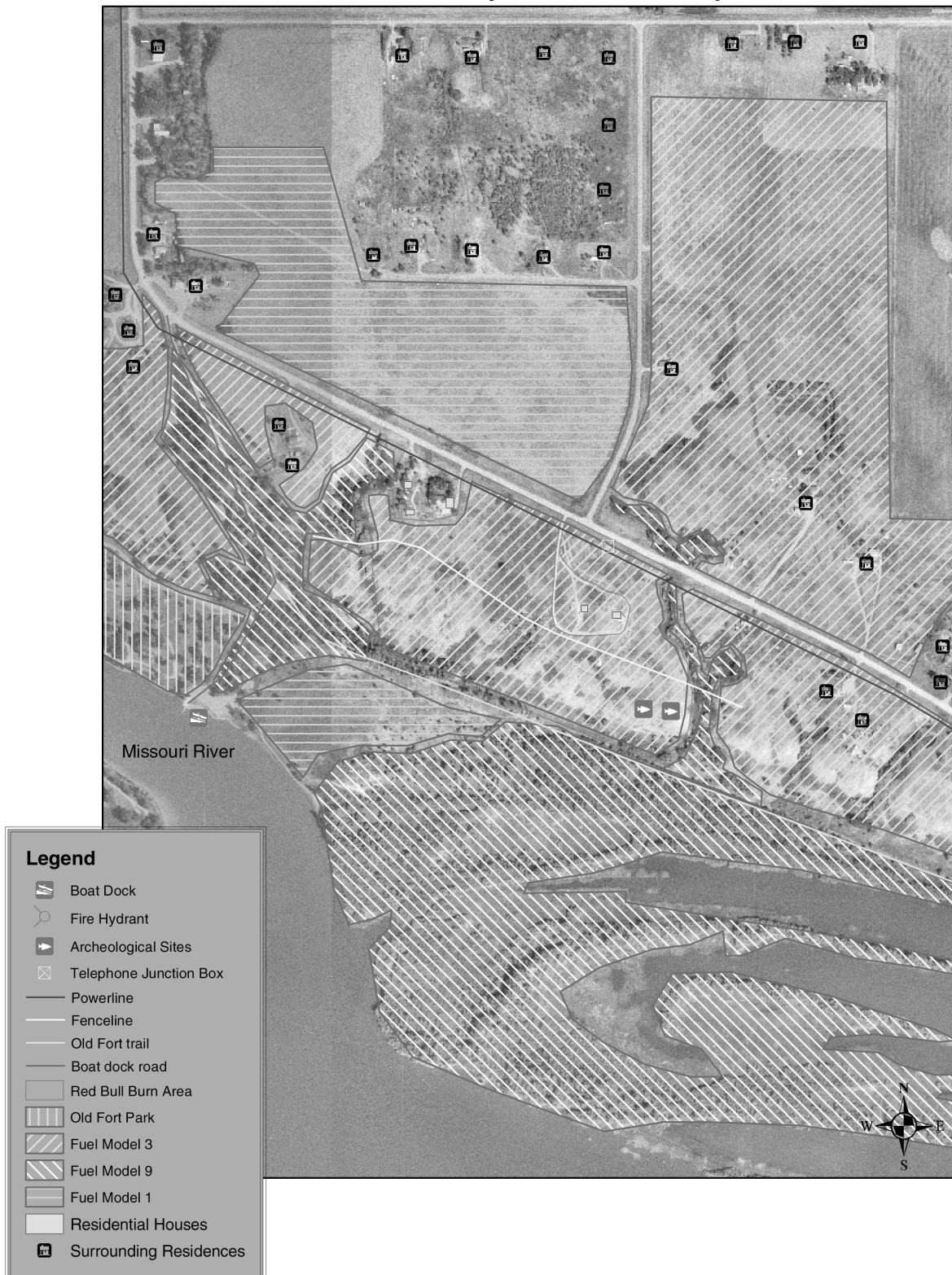
OUTLINE	AIDS & CUES
<p>3. Head fire</p> <p>A line of fire is ignited at the downwind end of the project or unit from a barrier. The fire is allowed to burn across the unit.</p> <ul style="list-style-type: none"> • Highest fire intensities can be achieved. • Requires a good barrier at upwind side of the unit. • Quickest of ignition methods for large areas. • Used for light fuel loading conditions. • Used for maximum reduction of fuel in some fuel types. 	7C-13-RX341-PPT
<p>4. Flank fire</p> <p>Lines of fire are ignited directly into the wind; the lines spread at right angles to wind.</p> <ul style="list-style-type: none"> • Can produce low, moderate, or high fire intensities. • Requires good knowledge of fire behavior. • Used often to secure the flanks of a strip-head fire or to supplement a backing fire. 	7C-14-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Can be used to burn a large area in a relatively short time when a head fire may be too intense. • Cannot stand much variation in wind direction. <p>5. Dot or point source</p> <p>A series of small spot fires are ignited, which generally spread in all directions as they burn together (similar to a series of strip head fires).</p> <ul style="list-style-type: none"> • Can produce fire intensities greater than a backing fire, but not as much as a strip head fire. • Requires some experience to know when to tip the torch. • Ignition spacing requires monitoring and adjusting to achieve desired fire behavior. <ul style="list-style-type: none"> – Close spacing produces fires that burn into each other before the flame length and intensity level is reached. – Be aware that a large number of small fires burning simultaneously can produce the same intensity as a large head fire. 	<p>7C-15-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Wind direction can be variable. • Used with aerial ignitions, large areas can be safely ignited. <p>6. Ring or center fire</p> <p>Fire is ignited on the downwind edge against a barrier; when secured, the entire perimeter of the unit or project is ignited and the flame fronts allowed to converge.</p> <p>One or more spot fires are often ignited in the center of the area and allowed to develop before the perimeter of the unit or project is ignited.</p> <ul style="list-style-type: none"> • Burn intensity can be high to extreme. • Used on level ground or where a slight slope will aid in creating a convection column. • Convective column can create spotting risk. • Used mostly in light and variable or no wind conditions. 	<p>7C-16-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Helpful questions and hints to generate linking the ignition plan to other elements:</p> <ol style="list-style-type: none"> 1. What are the capabilities of ignition personnel compared to the size of project? Strip head firing a wide unit with very narrow spacing between strips can quickly tire out ignition personnel. Consider the following: <ul style="list-style-type: none"> • Aerial ignitions. • Breaking the project into units. • ATV use? If ATVs are used with torches, or to support ignition operations, you must ensure safe use (may not be a good idea in rough terrain). 2. Are there smoke management or air quality impacts and issues? How do the ignition patterns and techniques affect them? 3. Are there ignition situations that need special consideration in the JHA or during briefing? 4. How does the contingency plan relate to the ignition and holding? 5. Will constant communication be available with all the ignition personnel? 	<p>7C-17-RX341-PPT</p>

Crow Creek Agency Red Bull Prescription Burn Burn Unit and Adjacent Features Map



UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 7D – Implementation: Holding Plan

Time 1 Hour

Objectives

1. Describe general procedures to be used for operations to maintain the fire within prescription and project area, until the fire is declared out.
2. Describe critical holding points and potential mitigation actions.

Strategy

This unit provides direction for completing the holding plan element for the prescribed fire plan. Several items covered in this unit are covered in other units as well. It is important to relay to the students how the elements of the plan are related.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan

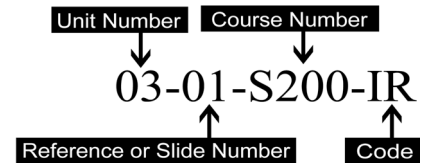
Outline

- I. General Procedures
- II. Critical Holding Points

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7D – Implementation: Holding Plan

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7D-1-RX341-PPT
PRESENT LESSON OBJECTIVES.	7D-2-RX341-PPT
I. GENERAL PROCEDURES	7D-3-RX341-PPT
A. Holding Plan	
<p>A holding plan identifies efforts involved in maintaining the fire within the identified plan parameters.</p> <ul style="list-style-type: none">• The plan is developed in response to the ignition plan, and is designed to maintain the prescribed fire within prescription and project boundary.• The holding plan should identify locations, quantity, type and kind (capabilities) of all the required resources, their assignments, and other general procedures.• The holding plan should cover all phases of implementation until declared out.• May need to develop different organizations for varying stages of implementation (holding vs. mopup and patrol, different ignition operations, different prescriptions).	7D-4-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Multiple prescriptions may require identifying multiple complexity ratings and developing multiple holding organizations. • The pre-burn considerations section of the prescribed fire should address any holding preparation activities that are required to implement the holding plan. • Holding plans can be very detailed and structured, or a simple narrative. <p>B. Considerations in Developing a Holding Plan</p> <p>Must take into account all the variables addressed in the prescribed fire:</p> <ul style="list-style-type: none"> • Fuels (inside and outside the units) and anticipated fire behavior will help determine capabilities of resources. <ul style="list-style-type: none"> – Consider worst case prescribed fire behavior (including spotting). • Designation of contingency lines or a project boundary. • Availability of holding resources and support for those resources. • Vehicle access. • Specific protection needs for private property, cultural sites, and other sensitive features. 	<p>7D-5-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Considerations that may determine mopup and patrol requirements (smoke, risk associated with weather conditions, land use impacts). • Fire control lines. • Water sources. • Helispots • Critical holding points in the control lines. • Other features pertinent to the holding operation requiring protection. • Initial resource and equipment placement. 	7D-6-RX341-PPT
<p>C. Sequence and Deployment of Resources for Holding Activities</p> <p>The sequence and/or location of activities to be undertaken in support of the ignition operation must be identified in the plan.</p> <ul style="list-style-type: none"> • Identify the deployment of resources for protection of: <ul style="list-style-type: none"> – Critical holding points – Structures – Utilities – Other sensitive features • Take care of spot fires and slopovers. 	7D-7-RX341-PPT

OUTLINE	AIDS & CUES
<p>D. Safety</p> <ul style="list-style-type: none"> • The holding operation can frequently pose the highest risk of injury and exposure to smoke. • The holding plan, and the public and personnel safety medical element, must address safety issues related to the holding operation by identifying and mitigating: <ul style="list-style-type: none"> – Any communication gaps – Accessibility concerns – LCES – Physical demands – Heat and smoke exposure concerns <p>ASK STUDENTS:</p> <p>Where else can safety concerns for holding be addressed?</p> <p>Answer: Safety Element, JHA, Medical plan, Aviation plan, complexity analysis.</p>	<p>7D-8-RX341-PPT</p>
<p>E. Mopup Components</p> <ul style="list-style-type: none"> • Process of making a fire area safe (firefighter and public safety). • Process of containing a fire to eliminate escape. • Process of mitigating smoke hazards. 	<p>7D-9-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>F. Mopup and Patrol</p> <ul style="list-style-type: none"> • Clearly identify who is responsible for mopup and patrol; frequently it is the burn boss or holding boss. • Specify the: <ul style="list-style-type: none"> – Anticipated number and type of resources. – Duration of patrol. – Conditions for mopup and patrol. • The prescribed fire plan may include general standards for mopup. • The burn boss or holding boss will make specific mopup and patrol assignments once holding objectives have been achieved. 	7D-10-RX341-PPT
<p>G. Duration of Mopup and Patrol</p> <ul style="list-style-type: none"> • The burn boss is responsible for the prescribed fire from the pre-burn activity phase, up until the point he/she (or designee) declares the burn “out” or turns the burn over to the local agency. • The prescribed fire plan may identify the criteria that will be used by the burn boss to determine when the burn can be declared out. 	7D-11-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="203 281 789 317">II. CRITICAL HOLDING POINTS</p> <p data-bbox="298 367 938 403">A. Indicators of Critical Holding Points</p> <ul data-bbox="396 453 1105 1087" style="list-style-type: none"> <li data-bbox="396 453 1105 533">• Snags, ladder fuels, jackpots, flashy fuels near or along control lines. <li data-bbox="396 583 1105 705">• Fuels outside control lines that would contribute to increased fire behavior or control problems. <li data-bbox="396 756 1105 835">• Private property, cultural sites, and other sensitive features. <li data-bbox="396 886 1105 966">• Side-slope control lines on top side of burn units. <li data-bbox="396 1016 1105 1087">• Other factors that may contribute to slopover. <p data-bbox="298 1138 846 1173">B. Potential Mitigation Measures</p> <ul data-bbox="396 1224 1045 1728" style="list-style-type: none"> <li data-bbox="396 1224 1045 1304">• Fall snags, clear back ladder fuels, and jackpots. <li data-bbox="396 1354 1045 1390">• Blackline, wetline, wider control line. <li data-bbox="396 1440 1045 1520">• Modify burn prescription to minimize slopover or spotting. <li data-bbox="396 1570 1045 1606">• Stage resources at sensitive sites. <li data-bbox="396 1656 1045 1728">• Minimize side-slope doglegs in control lines. 	<p data-bbox="1136 281 1435 317">7D-12-RX341-PPT</p> <p data-bbox="1136 1138 1435 1173">7D-13-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="300 281 748 321">C. Minimum Organization</p> <p data-bbox="396 365 980 405">Should match Element 11 of burn plan.</p> <p data-bbox="203 449 496 489">ASK STUDENTS:</p> <p data-bbox="396 533 1062 615">Where else should the critical holding points and mitigation measures be documented?</p> <p data-bbox="396 659 1029 741">Answer: Complexity analysis, pre-burn considerations, contingency plan.</p> <p data-bbox="203 827 573 867">CLASS DISCUSSION:</p> <p data-bbox="203 911 1081 993">Refer students to the Holding Plan element of the Red Bull Prescribed Fire Plan. Ask students:</p> <ol data-bbox="203 1037 1094 1339" style="list-style-type: none"> 1. How does the plan address slopovers or spot fires? 2. What personnel and public safety features are identified in the plan? 3. What are the pre-burn considerations that will aid in implementing the holding plan? <p data-bbox="203 1383 496 1423"><u>End of Discussion.</u></p> <p data-bbox="203 1509 769 1549">REVIEW LESSON OBJECTIVES.</p>	<p data-bbox="1141 281 1435 321">7D-14-RX341-PPT</p> <p data-bbox="1141 827 1435 867">7D-15-RX341-PPT</p> <p data-bbox="1141 1509 1435 1549">7D-16-RX341-PPT</p>

UNIT OVERVIEW

Course	Prescribed Fire Plan Preparation, RX-341
Unit	7E – Implementation: Contingency Plan and Wildfire Conversion
Time	2 Hours

Objectives

1. Identify the importance of the contingency plan as it relates to risk management and burn objectives.
2. Identify contingency plan elements.
3. Describe the concepts of trigger points for contingency planning.
4. Describe the process of converting a prescribed fire to a wildfire.

Strategy

This unit provides direction for completing the contingency plan element for the prescribed fire plan and the policies guiding the conversion of a prescribed fire to a wildfire.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 6, 7, and 8 of the Day 3 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Instructors may provide additional risk assessment tools.

Exercise

- Contingency Resource Calculations (page 7E.11)

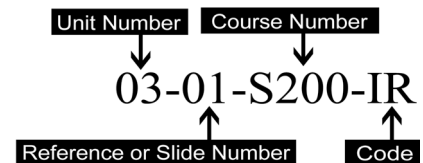
Outline

- I. Relating the Contingency Plan to Risk Management and Burn Objectives
- II. Components of Contingency Plans
- III. Trigger Points
- IV. Wildfire Conversion

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide IR – Instructor Reference
SW – Student Workbook SR – Student Reference
HO – Handout PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7E – Implementation: Contingency Plan and Wildfire Conversion

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7E-1-RX341-PPT
PRESENT LESSON OBJECTIVES.	7E-2-RX341-PPT
<p>I. RELATING THE CONTINGENCY PLAN TO RISK MANAGEMENT AND BURN OBJECTIVES</p> <p>The contingency plan identifies possible (but unlikely) events, and the contingency resources and actions needed to mitigate those events.</p> <p>A. Contingency plans are developed to:</p> <ul style="list-style-type: none"> • Identify the unexpected. • Answer the “what ifs.” • Mitigate or manage risk. <p>In prescribed fire, we all recognize there are risks and that our best plans do not always result in a desired outcome.</p> <p>Contingency actions are required to be taken when a project exceeds (or may exceed) its planned intent.</p> <p>These actions are taken to return the project to its intended design and to reduce the chances of unfavorable consequences of anticipated or unanticipated event(s).</p> <p>Contingency planning is like providing for adequate initial attack.</p>	7E-3-RX341-PPT
	7E-4-RX341-PPT

OUTLINE	AIDS & CUES
<p data-bbox="277 283 987 321">B. Considerations for contingency planning:</p> <ul data-bbox="383 367 1101 1472" style="list-style-type: none"> <li data-bbox="383 367 1101 447">• Requires verified availability of specified contingency resources. <li data-bbox="383 493 1101 573">• Sizeup of your unit (helps to identify contingency needs). <li data-bbox="383 619 1101 657">• Fire history and lessons learned. <li data-bbox="383 703 1101 825">• Fuel and terrain: line locations, critical holding points, snags, jackpots or ladder fuels near lines. <li data-bbox="383 871 1101 951">• Access: transportation routes, water locations. <li data-bbox="383 997 1101 1077">• Barriers: rock slides, outcrops, snowline, vegetation changes (aspen stands, riparian). <li data-bbox="383 1123 1101 1203">• Special hazards: fuels outside units, power lines, structures. <li data-bbox="383 1249 1101 1287">• Weather: wind events/switches, RH drops. <li data-bbox="383 1333 1101 1455">• Safety: LCES, smoke issues, slash loading (inhibits walking or creates fire behavior changes). 	<p data-bbox="1130 283 1398 321">7E-5-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Contingency planning may be incorporated into all implementation phases of prescribed fires.</p> <ul style="list-style-type: none"> • Ignition • Holding • Mopup and patrol (until the burn is declared out) 	7E-6-RX341-PPT
<p>D. When are the contingency actions implemented?</p> <ul style="list-style-type: none"> • When established prescription parameters, trigger points, or limits are exceeded. • Prescription elements not being met (over- or underachieving fire behavior or other objectives). • Safety violations, serious accidents/injury. • Smoke sensitive sites impacted. • Historic/archeological/hazmat sites discovered. • Unplanned, independent events such as wildfire activity that requires contingency resources to be pulled. • Insufficient time to complete prescribed fire operations. <p>EMPHASIZE:</p> <p>Contingency plans or actions can be implemented anytime during a prescribed fire and do not constitute a wildfire declaration.</p>	7E-7-RX341-PPT

OUTLINE	AIDS & CUES
<p>III. TRIGGER POINTS</p> <p>A trigger point is a geographic or temporal limit that initiates a pre-determined management response.</p> <p>The contingency plan establishes trigger points or limits that indicate when additional holding resources and actions are needed to ensure the fire continues to meet resource and control objectives.</p> <p>Contingency planning and trigger points are an “if/then” decisionmaking process.</p> <p>A. Trigger Point Considerations</p> <ol style="list-style-type: none"> 1. Threats to burn unit or project boundaries. <p>An escaped prescribed fire must be declared a wildfire when the fire has spread outside the project boundary, or is likely to do so, and cannot be contained by the end of the next burning period.</p> 2. Approaching prescription limits (top and bottom, over- or underachieving). 3. Risk to adjacent ownerships, sensitive areas, and fuels. <p>POINT OUT THE LINK TO ANALYZING FUELS OUTSIDE THE UNIT/PROJECT BOUNDARIES (AFFECTS COMPLEXITY ANALYSIS, PRESCRIPTION, ORGANIZATION, IGNITION AND HOLDING, AS WELL AS CONTINGENCY PLAN).</p>	<p>7E-12-RX341-PPT</p> <p>7E-13-RX341-PPT</p> <p>7E-14-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ol style="list-style-type: none"> 4. Smoke management issues. 5. Other issues based on objectives, current management policy and external events. 6. In developing trigger points, expected fire behavior and other management activity(s) should be strongly considered. <p>Examples:</p> <ul style="list-style-type: none"> • If the visibility on Highway 48 is less than ½ mile, the burn boss contacts State Highway Patrol to manage traffic. • If holding forces are managing three spot fires simultaneously, ignition will stop. Ignition personnel assist with holding operations. • Wildfires or other prescribed fires within jurisdictional boundaries, Geographic Area Coordination Centers, etc. 	
<p>B. Resource Considerations</p> <ol style="list-style-type: none"> 1. Resource availability and travel times 2. Resource capabilities 3. Shift length and numbers of shifts 4. Budgetary constraints 	<p>7E-15-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="370 283 808 321">5. Contingency resources</p> <ul data-bbox="467 367 1096 1344" style="list-style-type: none"> <li data-bbox="467 367 1096 619">• Contingency resources, if identified as required in the plan, have to be verified available to arrive by the time specified (per “The Guide”); usually done by burn boss or designee. <li data-bbox="467 661 1096 871">• If contingency resources are on scene, they must be performing non-essential functions so they may continue to be available for contingency actions. <li data-bbox="467 913 1096 1123">• If your contingency resources become unavailable, actions must be taken to secure operations until identified contingency resources (or capabilities) are replaced. <li data-bbox="467 1165 1096 1344">• An action taken by contingency resources on a prescribed fire is usually managed with the prescribed fire organization. <p data-bbox="548 1386 1096 1512">Actions taken after a prescribed fire is converted to a wildfire are managed with the ICS organization.</p>	<p data-bbox="1128 1176 1421 1213">7E-16-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="180 281 703 317">IV. WILDFIRE CONVERSION</p> <p data-bbox="274 367 1049 575">The person(s) identified in the plan must declare a prescribed fire a wildfire when they determine that contingency actions have failed, or are likely to fail, and cannot be mitigated within the next burning period.</p> <p data-bbox="274 625 1097 787">Depending on individual agency policy, a prescribed fire can be converted to a wildfire for reasons other than an escape. After a wildfire declaration, an escaped RX fire cannot be returned to RX fire status.</p> <p data-bbox="274 837 842 873">Wildfire conversion element includes:</p> <ul data-bbox="274 924 1097 1644" style="list-style-type: none"> <li data-bbox="274 924 1011 1045">• Wildfire declaration (the prescribed fire plan specifies who has the authority to declare a wildfire). <li data-bbox="274 1096 1084 1215">• Incident Commander assignment (the prescribed fire plan identifies an incident commander for the declared wildfire). <li data-bbox="274 1266 1089 1386">• Interactions between prescribed fire and suppression resources (will onsite resources assist with the suppression or be released?). <li data-bbox="274 1436 1045 1514">• Notifications (dispatch, Agency Administrator, adjacent land owners, region, etc.). <li data-bbox="274 1564 1097 1644">• Extended attack actions and opportunities to aid in fire suppression. <p data-bbox="274 1694 1062 1772">Good contingency planning precludes/minimizes the need for wildfire declaration; pay now or pay later.</p>	<p data-bbox="1130 281 1417 317">7E-17-RX341-PPT</p> <p data-bbox="1130 837 1417 873">7E-18-RX341-PPT</p> <p data-bbox="1130 1694 1417 1730">7E-19-RX341-PPT</p>

Contingency Resource Calculations

Scenario information:

Available resources: Type 2 hand crew, Type 3 dozer, 3 Type 6 engines, all with 1 hour response time.

Inside burn unit: FM 5, 25% slope, windward side of hill, 100 acres and road at ridge break along top of burn unit.

Adjacent to burn unit: House ¼ mile away from and above the burn unit on flat ground in FM 2 open ponderosa pine stand, average 50 trees/acre and 60 feet tall.

Additional information can be found in the BehavePlus runs on pages 7E.15 – 7E.21.

1. Where would you go to get production rates for the assigned resources?

Fireline Handbook, PMS 410-1, Appendix A, pgs. 30 - 34

2. What are the production rates for each assigned resource, given the fuel models and environmental data?

Type 2 Handcrew:

Fuel Model 2: **16 chains/hr sustained; 60 (20x3.0) chains/hr initial action**

Fuel Model 5: **4 chains/hr sustained; 14 (20x0.7) chains/hr initial action**

Type 6 Engine with 2 personnel:

Fuel Model 2: **7 chains/hr (21 total for all 3 engines)**

Fuel Model 5: **6 chains/hr (18 total for all 3 engines)**

Type 3 Dozer:

Fuel Model 2: **Uphill 55-90 chains/hr; Downhill 90-110 chains/hr**

Fuel Model 5: **Uphill 45-70 chains/hr; Downhill 70-80 chains/hr**

3. When calculating your contingency resource needs, what fuel model should you use? Explain.

Fuel model 2. The contingency resources will likely only be called if the fire exceeds or threatens to exceed the unit boundary, but if contingency resources were called to shut down a burn due to smoke management or undesirable fire effects, a fuel model 5 will be used.

4. Given the containment runs on pages 7E.15 – 7E.21, what would you recommend as contingency resource needs for this scenario?

Dozer provides the most flexibility and support; would also be the most cost effective, in light of the threat to the house.

5. What mitigation measures could you take to negate/minimize the threat to this adjacent housing?

- **Stage the dozer on-site near the housing in combination with holding forces; engines should be able to contain any spots and keep slopover acreage to a minimum.**
- **Increase blackline width at top of unit prior to beginning main unit ignition.**
- **Foam or wetline FM2 area above top line.**
- **Station engine(s) for quick suppression response at the house.**
- **Plumb top line and support with porta-tank(s).**
- **Post lookout that can see flat area above the burn unit and over to the house.**
- **Lower allowable mid-flame wind speed variable of prescription.**
- **Fall any snags and clear down fuel concentrations within 100 feet of ridge break at top of unit.**

**Modules: IGNITE**

Description

Unit 7E Contingency Exercise

Fuel Moisture

1-h Moisture

%

8, 10, 12, 14, 16

Weather

Air Temperature

oF

45, 50, 55, 60, 65

Fuel Shading from the Sun

%

10

Unit 7E Contingency Exercise
Probability of Ignition from a Firebrand (%)

1-h Moisture %	Air Temperature oF				
	45	50	55	60	65
8	36	37	38	39	40
10	27	27	28	29	30
12	19	20	20	21	22
14	14	14	15	15	16
16	9	10	10	11	11

**Modules: SURFACE**Description Unit 7E Contingency Exercise - Inside Unit**Fuel/Vegetation Surface/Understory**Fuel Model 5**Fuel Moisture**1-h Moisture % 8, 10, 12, 14, 1610-h Moisture % 9100-h Moisture % Live Herbaceous Moisture % Live Woody Moisture % 50**Weather**Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0**Terrain**Slope Steepness % 25**Unit 7E Contingency Exercise - Inside Unit****Surface Rate of Spread (maximum) (ch/h)**

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
8	5.5	16.0	33.2	54.3	78.4	105.0
10	5.3	15.4	31.9	52.1	75.3	100.9
12	4.7	13.7	28.5	46.5	67.2	90.0
14	1.5	4.5	9.3	15.2	22.0	25.0
16	1.3	3.7	7.7	12.5	16.1	16.1

Unit 7E Contingency Exercise - Inside Unit**Flame Length (ft)**

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
8	3.2	5.2	7.3	9.1	10.8	12.3
10	3.1	5.0	7.0	8.8	10.4	12.0
12	2.8	4.6	6.4	8.0	9.5	10.8
14	1.0	1.6	2.3	2.9	3.4	3.6
16	0.8	1.4	1.9	2.4	2.7	2.7

**Modules: SPOT**Description Unit 7E Contingency Exercise - Spot**Fuel/Vegetation Overstory**Canopy Height ft 0**Weather**20-ft Wind Speed (upslope) mi/h 0, 5, 10, 15, 20, 25**Terrain**Ridge-to-Valley Elevation Difference ft 600Ridge-to-Valley Horizontal Distance mi 0.5Spotting Source Location mw**Fire**Flame Length ft 1, 2, 3, 4, 5, 6, 7, 8, 9,**Acceptable Fire Conditions**Spot Dist from Wind Driven Surface Fire (mi) ☒ 0.0 - 0.2**Unit 7E Contingency Exercise - Spot**
Spot Dist from Wind Driven Surface Fire (mi)

Flame Length ft	20-ft Wind Speed (upslope) mi/h					
	0	5	10	15	20	25
1.0	0.0	0.0	0.1	0.1	0.1	0.1
2.0	0.0	0.1	0.1	0.1	0.2	0.2
3.0	0.0	0.1	0.1	0.2	0.2	0.2
4.0	0.0	0.1	0.2	0.2	0.3	0.3
5.0	0.0	0.1	0.2	0.2	0.3	0.3
6.0	0.0	0.1	0.2	0.3	0.3	0.4
7.0	0.0	0.1	0.2	0.3	0.4	0.4
8.0	0.0	0.2	0.3	0.3	0.4	0.5
9.0	0.0	0.2	0.3	0.4	0.4	0.5
10.0	0.0	0.2	0.3	0.4	0.5	0.6
11.0	0.0	0.2	0.3	0.4	0.5	0.6
12.0	0.0	0.2	0.3	0.4	0.5	0.6

**Modules: SURFACE**Description Unit 7E Contingency Exercise - Outside Unit**Fuel/Vegetation Surface/Understory**Fuel Model 2**Fuel Moisture**1-h Moisture % 8, 10, 12, 14, 1610-h Moisture % 9100-h Moisture % 10Live Herbaceous Moisture % 50Live Woody Moisture % **Weather**Midflame Wind Speed (upslope) mi/h 0.0, 2.0, 4.0, 6.0, 8.0, 10.0**Terrain**Slope Steepness % 5**Unit 7E Contingency Exercise - Outside Unit****Surface Rate of Spread (maximum) (ch/h)**

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
8	2.6	9.4	26.8	53.3	88.5	131.8
10	2.3	8.4	23.9	47.6	79.0	117.7
12	1.9	6.7	18.9	37.7	62.5	93.2
14	1.0	3.6	10.4	20.7	34.3	51.0
16	0.0	0.0	0.0	0.0	0.0	0.0

Unit 7E Contingency Exercise - Outside Unit**Flame Length (ft)**

1-h Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
8	1.9	3.4	5.5	7.6	9.6	11.5
10	1.8	3.1	5.1	7.0	8.8	10.6
12	1.4	2.6	4.2	5.8	7.3	8.7
14	0.8	1.5	2.5	3.4	4.3	5.1
16	0.0	0.0	0.0	0.0	0.0	0.0

**Modules: SURFACE, SIZE, CONTAIN**

Description	Unit	7E Contingency Exercise - Surface, Size, Con
Fuel/Vegetation Surface/Understory		
Fuel Model		2
Fuel Moisture		
1-h Moisture	%	8
10-h Moisture	%	9
100-h Moisture	%	10
Live Herbaceous Moisture	%	50
Live Woody Moisture	%	
Weather		
Midflame Wind Speed (upslope)	mi/h	0.0, 2.0, 4.0, 6.0, 8.0, 10.0
Terrain		
Slope Steepness	%	5
Fire		
Elapsed Time	h	1
Suppression		
Suppression Tactic		Rear
Line Construction Offset	ch	0
Resource Line Production Rate	ch/h	16, 21, 60
Resource Arrival Time	h	1
Resource Duration	h	10

Unit 7E Contingency Exercise - Surface, Size, Contain
Area (ac)

Midflame Wind Speed mi/h	Resource Line Production Rate ch/h		
	16.0	21.0	60.0
0.0	1.1	1.1	1.1
2.0	6.1	6.1	6.1
4.0	32.3	32.3	32.3
6.0	97.2	97.2	97.2
8.0	217.1	217.1	217.1
10.0	406.4	406.4	406.4

Unit 7E Contingency Exercise - Surface, Size, Contain
Perimeter (ch)

Midflame Wind Speed mi/h	Resource Line Production Rate ch/h		
	16.0	21.0	60.0
0.0	12	12	12
2.0	28	28	28
4.0	69	69	69
6.0	128	128	128
8.0	203	203	203
10.0	293	293	293

Unit 7E Contingency Exercise - Surface, Size, Contain
Contain Status

Midflame Wind Speed mi/h	Resource Line Production Rate ch/h		
	16.0	21.0	60.0
0.0	Contained	Contained	Contained
2.0	Withdrawn	Withdrawn	Contained
4.0	Withdrawn	Withdrawn	Withdrawn
6.0	Withdrawn	Withdrawn	Withdrawn
8.0	Withdrawn	Withdrawn	Withdrawn
10.0	Withdrawn	Withdrawn	Withdrawn

Unit 7E Contingency Exercise - Surface, Size, Contain
Contained Area (ac)

Midflame Wind Speed mi/h	Resource Line Production Rate ch/h		
	16.0	21.0	60.0
0.0	12.7	9.6	5.8
2.0	-1.0	-1.0	50.7
4.0	-1.0	-1.0	-1.0
6.0	-1.0	-1.0	-1.0
8.0	-1.0	-1.0	-1.0
10.0	-1.0	-1.0	-1.0

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 7F – Implementation: Communication

Time 15 minutes

Objective

- Identify the communications needs to implement a prescribed fire plan.

Strategy

This unit provides direction for completing the communication plan required in a prescribed fire plan.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan

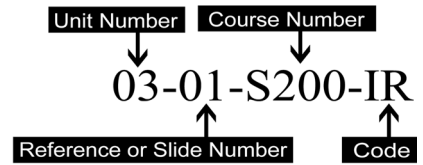
Outline

- I. Communication Needs
 - A. Radio Considerations
 - B. Other Communication

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7F – Implementation: Communication

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7F-1-RX341-PPT
PRESENT LESSON OBJECTIVE.	7F-2-RX341-PPT
I. COMMUNICATION NEEDS	7F-3-RX341-PPT
Identify and assign command, tactical, and air operations frequencies as needed. Consider using ICS Form 205 as a template.	
REFER STUDENTS TO THE ICS FORM 205 (SW page 7F.5; IG page 7F.5).	7F-1-RX341-IR/SR
A. Radio Considerations	7F-4-RX341-PPT
Identify:	
<ul style="list-style-type: none">• Potential radio blind spots by walking the area.• Potential repeater sites (human or other).• Outside resources (ensure frequencies are listed in the communication plan and communication can be maintained).• If holding and ignition will be working on different channels.• Crew net use.• Tactical frequency for operational use.	

INCIDENT RADIO COMMUNICATIONS PLAN				1. INCIDENT NAME	2. DATE/TIME PREPARED	3. OPERATIONAL PERIOD DATE/TIME
4. BASE RADIO CHANNEL UTILIZATION						
SYSTEM/CACHE	CHANNEL	FUNCTION	FREQUENCY/TONE	ASSIGNMENT	REMARKS	
5. PREPARED BY (COMMUNICATIONS UNIT)						

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 7G – Implementation: Public and Personnel Safety, Medical

Time 15 minutes

Objective

- Describe considerations for personnel and public safety, and emergency procedures.

Strategy

This unit provides direction for documenting safety elements required in a prescribed fire plan.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding question 10 of the Day 4 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Six Minutes for Safety Web site:
http://www.nifc.gov/sixminutes/dsp_sixminutes.php

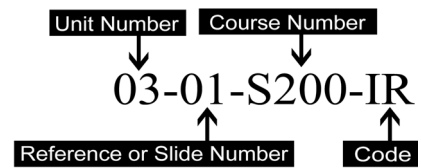
Outline

- I. Personnel/Public Safety and Emergency Procedures
 - A. Fireline Personnel Safety
 - B. Public Safety
 - C. Highly Visible Burns
 - D. Closures
 - E. Safety-related Web Site

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 7G – Implementation: Public and Personnel Safety, Medical

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	7G-1-RX341-PPT
PRESENT LESSON OBJECTIVE.	7G-2-RX341-PPT
I. PERSONNEL/PUBLIC SAFETY AND EMERGENCY PROCEDURES	7G-3-RX341-PPT
A. Fireline Personnel Safety	
1. Describe provisions to be made for personal safety.	
2. Require all personnel who are within the active burn area to wear personal protective equipment (PPE).	
3. Identify safety hazards (including smoke exposure) and measures taken to mitigate those hazards. Examples may include:	
• Falling of hazard trees along egress routes or workable areas within the burn.	
• Rotation of personnel on smoke side of prescribed fire.	
• Timing of the prescribed fire and length of shift (work/rest ratio).	
• Others?	

OUTLINE	AIDS & CUES
<ol style="list-style-type: none"> 4. Specify emergency medical procedures, evacuation routes, and emergency facilities to be used. This section of the prescribed fire plan was previously referred to as the “medical plan.” 5. Reference to an established medical plan, such as a unit dispatch medical plan. 6. If no medical plan exists, consider using ICS 206 as a template. 7. A job hazard analysis (or other agency specific risk analysis) is required for each prescribed fire project. <p>The JHA or risk analysis is attached to the prescribed fire plan as an appendix.</p>	<p>7G-4-RX341-PPT</p> <p>7G-5-RX341-PPT</p>
<p>REFERENCE RED BULL PRESCRIBED FIRE PLAN, APPENDIX D, JHA.</p> <p>B. Public Safety</p> <ol style="list-style-type: none"> 1. Assign a public safety specialist or qualified personnel as necessary. <ul style="list-style-type: none"> • Law Enforcement • Federal, State, County • Tribal • Local 2. Post necessary signage <ul style="list-style-type: none"> • Smoke ahead, low visibility • Workers on road • Prescribed fire ahead – do not report 	<p>7G-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ol style="list-style-type: none"> 3. Follow local signage regulations <ul style="list-style-type: none"> • Sign size • Location • Readability 4. Use “universal design” sign for: <ul style="list-style-type: none"> • Non-English • Non-reading public • Flagging 5. Post-burn considerations <ul style="list-style-type: none"> • Removal of posted signs • Removal of flagging 	
<p>C. Highly Visible Burns</p> <ol style="list-style-type: none"> 1. Use a public information officer (PIO) for: <ul style="list-style-type: none"> • Public information • Education needs • Direct contact with public and media 2. Use prescribed fire as an educational tool to assist in long-term understanding of prescribed fire and its effects. <p>Participants may include front desk personnel, external affairs, etc.</p>	<p>7G-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>D. Closures</p> <ol style="list-style-type: none"> 1. Are closures needed for the area(s)? 2. How long is the anticipated need for closures? 3. Will permittee be allowed to cross during ignition? 4. Can you keep a road open, but close off the burn area outside the road? 5. Can lead vehicles be used to facilitate traffic movement? 6. Should barriers be used to deter stopping or site visits? <p>E. Safety-related Web Site</p> <p>Six Minutes for Safety: http://www.nifc.gov/sixminutes/dsp_sixminutes.php</p> <p>CLASS DISCUSSION: Refer students to element 13 of the Red Bull Prescribed Fire Plan.</p> <p>REVIEW LESSON OBJECTIVE.</p>	<p>7G-8-RX341-PPT</p>
<p>REVIEW LESSON OBJECTIVE.</p>	<p>7G-9-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 8 – Monitoring

Time 1 Hour

Objective

- Identify and discuss the four levels of monitoring and what needs to be covered in the prescribed fire plan.

Strategy

This unit provides an overview of the four levels of monitoring and provides the student with direction for completing the monitoring section of the prescribed fire plan.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 3, 4, and 5 of the Day 4 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan

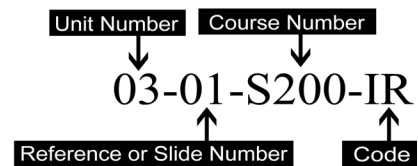
Outline

- I. The Four Levels of Monitoring and the Prescribed Fire Plan
 - A. Level One: Environmental Monitoring
 - B. Level Two: Fire Monitoring
 - C. Level Three: Short-Term Change Monitoring
 - D. Level Four: Long-Term Change Monitoring
- II. Monitoring Elements Required for the Prescribed Fire Plan

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 8 – Monitoring

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	8-1-RX341-PPT
PRESENT UNIT OBJECTIVE.	8-2-RX341-PPT
I. THE FOUR LEVELS OF MONITORING Prescribed fire monitoring is defined as the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting resource and control objectives. Monitoring should include local unit standards and data collection requirements that fit into local, regional, and national monitoring programs. Why do we monitor? What is the cost of not monitoring?	8-3-RX341-PPT
A. Level One: Environmental Data Monitoring 1. Weather <ul style="list-style-type: none">• Long- and short-term trends of precipitation, temperature, wind, etc.• Often use indices such as Keetch Byrum Drought Index, Energy Release Component, or Burn Index.	8-4-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Onsite weather conditions <ul style="list-style-type: none"> – Temperature – Relative humidity – Wind speed and direction (timing) – Cloud cover – Atmospheric stability <p>This information is required to obtain a spot weather forecast.</p> <p>2. Fuel moisture monitoring</p> <p>Usually monitor trends up to a few weeks before the burn using weather stations, forecasts, site observations, and NFDRS stations.</p> <p>Select a representative site to consistently monitor. The prescription identifies the fuel classes that need to be monitored.</p> <ul style="list-style-type: none"> • 1-hour fuels <p>Best monitored on day of burn using onsite weather conditions.</p> • 10-hour fuels <p>Best monitored on day of burn, but can be monitored up to two days before the burn.</p> 	

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • 100-hour fuels <p>Can be monitored using fire danger trends/indices up to two weeks preceding the burn. Can also be monitored on the day of the burn.</p> • Large woody and live fuels <p>Should monitor seasonal and drought trends/indices. These fuels are critical to monitor to assess short- and long-term fire effects.</p> <p>3. Soil/duff moisture</p> <ul style="list-style-type: none"> • Soil moisture may be critical if you are concerned about duff and organic fuel consumption. • Soil moisture can be monitored with sampling or by using indices. <p>4. Fuel conditions</p> <ul style="list-style-type: none"> • Loading by size class • Continuity (vertical and horizontal) • Fuel depth • Other fuel characteristics 	

OUTLINE	AIDS & CUES
<p data-bbox="284 281 958 321">B. Level Two: Fire Behavior Monitoring</p> <ol style="list-style-type: none"> <li data-bbox="381 365 1071 447">1. Describe fire behavior/fire intensity and smoke. It is critical that fire behavior is monitored to evaluate if the operation is meeting objectives (related to the prescription and holding plan) for all phases of the burn. <li data-bbox="381 709 1055 961">2. Describe what fire behavior factors are important to monitor. <ul style="list-style-type: none"> <li data-bbox="479 835 941 875">• Flame length/height/depth <li data-bbox="479 877 763 917">• Rate of spread <li data-bbox="479 919 982 961">• Torching, crowning, spotting <li data-bbox="381 1008 1079 1476">3. Describe who will monitor fire behavior and how the data will be recorded. <ul style="list-style-type: none"> <li data-bbox="479 1134 1015 1218">• Use FEMOs, collateral duty for qualified personnel. <li data-bbox="479 1264 1015 1348">• Data is usually recorded on weather/fire observation forms. <li data-bbox="479 1394 1039 1476">• Recorded fire behavior is usually descriptive. <li data-bbox="381 1522 1112 1896">4. Monitor and document smoke production and dispersion. May also be covered in the smoke management section of the prescribed fire plan. <ul style="list-style-type: none"> <li data-bbox="479 1732 690 1772">• Datarams <li data-bbox="479 1774 698 1814">• Observers <li data-bbox="479 1816 690 1856">• Visibility <li data-bbox="479 1858 649 1896">• Flights 	<p data-bbox="1157 281 1404 321">8-5-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>C. Level Three: Short-Term Change Monitoring (typically through the next growing season)</p> <p>Detects first order fire effects such as:</p> <ul style="list-style-type: none"> • Crown or vegetation scorch • Bark or vegetation char • Fuel consumption by size class • Duff or organic layer consumption • Vegetation consumption 	8-6-RX341-PPT
<p>D. Level Four: Long-Term Change Monitoring</p> <p>Measures changes over long periods of time, often including many management activities (fire, mechanical, etc.).</p> <p>It is usually not included in a prescribed fire plan, but references to ongoing level four monitoring may be included.</p>	8-7-RX341-PPT
<p>II. MONITORING ELEMENTS REQUIRED FOR THE PRESCRIBED FIRE PLAN</p>	8-8-RX341-PPT
<p>REFER STUDENTS TO PRESCRIBED FIRE TEMPLATE, ELEMENT 20.</p> <p>A. The intensity of monitoring is determined by:</p> <ul style="list-style-type: none"> • Agency direction • NEPA requirements • Threatened and endangered species concerns • Cultural/archaeological concerns • Goals and objectives 	The Guide

OUTLINE	AIDS & CUES
<p>B. The plan should identify who, when, and how the monitoring should be completed during all phases of the project.</p> <ul style="list-style-type: none"> • Fuels information required and procedures (Level 1 monitoring). • Weather (forecast and observed) monitoring required and procedures (Level 1 monitoring). • Fire behavior monitoring required and procedures (Level 2 monitoring). • Monitor to ensure prescribed fire plan objectives are met (Level 2, 3, and 4 monitoring). • Smoke dispersal monitoring required and procedures (Level 2 monitoring). <p>SHOW EXAMPLES OF VARIOUS MONITORING PLANS YOU HAVE USED.</p> <p>CLASS DISCUSSION: Refer students to element 20 of the Red Bull Prescribed Fire Plan. Ask students: Is it flexible? What are the constraints? Thorough? Excessive?</p> <p>REVIEW UNIT OBJECTIVE.</p>	<p>8-9-RX341-PPT</p>
<p>REVIEW UNIT OBJECTIVE.</p>	<p>8-10-RX341-PPT</p>

UNIT OVERVIEW

Course	Prescribed Fire Plan Preparation, RX-341
Unit	9 – Funding, Post-Burn Activities (Rehabilitation and Reports), and Appendices
Time	30 minutes

Objectives

1. Identify the funding source(s) and estimated costs for all phases of the prescribed fire.
2. Identify post-burn rehabilitation to be detailed in the prescribed fire plan.
3. Identify required and optional reports to be completed for the prescribed fire plan.
4. Identify required and optional appendices to be attached to the prescribed fire plan.
5. Describe the prescribed fire plan project file requirements.

Strategy

This unit provides an overview of funding, rehabilitation, reports, appendices, and the project file. It is important to demonstrate how each of these items is related to the rest of the prescribed fire plan.

On completion of the unit, instructors should tie each prescribed fire plan element(s) back to the preliminary complexity analysis to ensure the prescribed fire plan addresses mitigation measures.

Important: Ensure information regarding questions 6 and 8 of the Day 4 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Instructors may provide completed local examples of the items covered in the unit.

Evaluation Method

- Day 3 Quiz (make one copy per student; located in Appendix D).

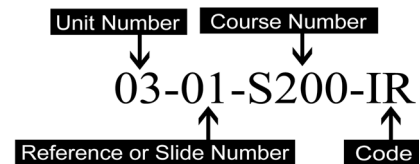
Outline

- I. Funding Sources and Estimated Costs
- II. Post-Burn Rehabilitation
- III. Reports
- IV. Appendices
- V. Project File Requirements

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide IR – Instructor Reference
SW – Student Workbook SR – Student Reference
HO – Handout PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 9 – Funding, Post-Burn Activities (Rehabilitation and Reports), and Appendices

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	9-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	9-2-RX341-PPT
I. FUNDING SOURCE(S) AND ESTIMATED COSTS	9-3-RX341-PPT
A. Why would you need to know your funding source(s)? <ul style="list-style-type: none">• Project implementation costs money and somebody has to pay for it. A funding source and an allocated budget are needed.• Knowing project costs and sources enables costs to be estimated for the next project.• When writing a prescribed fire plan for multiple units in a landscape, individual unit costs may need to be broken out.	
B. Possible Funding Sources <ul style="list-style-type: none">• Hazardous fuels program• Timber sales• Stewardship contracting• FWS endangered species recovery plans	9-4-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Non-government organizations • National Resources Conservation Service • Resource programs • Others? <p>C. Cost Development Considerations</p> <ul style="list-style-type: none"> • Project costs based on listing types and amounts of resources, equipment, and supplies needed (wildland fire situation analysis, fire program analysis, budget requests). • Collect costs from past projects and use to estimate future projects. Obtain data from your unit's budget analyst, budget tracking systems. • National Fire Plan Operations Reporting System (NFPORS) 	<p>9-5-RX341-PPT</p>
<p>D. Funding Section Example:</p> <ul style="list-style-type: none"> • Funding Source: Wildland Urban Interface • Estimated Cost: \$15,000 <ul style="list-style-type: none"> – Preparation: \$ 2,500 – Implementation: \$10,000 – Monitoring: \$ 2,500 	<p>9-6-RX341-PPT</p>
<p>CLASS DISCUSSION: Refer students to the Red Bull Prescribed Fire Plan. Discuss Element 6 and Appendix H.</p>	

OUTLINE	AIDS & CUES
<p data-bbox="188 281 812 317">II. POST-BURN REHABILITATION</p> <ul style="list-style-type: none"> <li data-bbox="285 367 1052 449">• Identify any rehabilitation to be accomplished, who will do it, and when it will be completed. <p data-bbox="355 495 623 531">This may include:</p> <ul style="list-style-type: none"> <li data-bbox="355 579 721 615">– Rolling berms back <li data-bbox="355 623 732 659">– Installing water bars <li data-bbox="355 667 958 703">– Covering firelines with slash/debris <li data-bbox="355 711 626 747">– Falling snags <li data-bbox="355 756 643 791">– Trash removal <li data-bbox="355 800 626 835">– Sign removal <ul style="list-style-type: none"> <li data-bbox="285 884 1109 1045">• Burned Area Emergency Rehabilitation (BAER)/ Emergency Stabilization and Rehabilitation (ESR) type activities should not be planned or funded for prescribed fire projects. <p data-bbox="355 1094 1101 1171">If these activities are needed, they must be funded from non-ESR subactivities.</p> <ul style="list-style-type: none"> <li data-bbox="285 1220 1000 1255">• Prescribed fire rehabilitation plan example: <p data-bbox="355 1304 1089 1430">Dozer firelines will be rehabilitated, including installing water bars and pulling berms back onto the line, as directed by the burn boss.</p>	<p data-bbox="1146 281 1393 317">9-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>V. PROJECT FILE REQUIREMENTS</p> <p>ASK STUDENTS WHAT THEIR AGENCY REQUIRES TO BE PLACED IN THEIR PROJECT FILES AND FILE MAINTENANCE REQUIREMENTS.</p> <p>A. Project File Information</p> <p>All prescribed fire project files contain the following information:</p> <ul style="list-style-type: none"> • Prescribed fire plan • Monitoring data including weather, fire behavior, and fire effects observations. • Weather forecasts • Notifications • Documented prescribed fire organization(s). • Any agreements related to implementation. • Multiple-day Go/No-Go Checklist(s), if applicable. • Revalidation of the Agency Administrator pre-ignition approval checklist, if applicable. <p>Agencies and administrative units may require additional information.</p>	<p>9-12-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>B. Optional Information</p> <p>Depending on the scope and complexity of the prescribed fire, optional information and further documentation may be included in the project file:</p> <ul style="list-style-type: none"> • After Action Review • Incident action plans, Unit Logs (ICS 214) • Press releases, etc. • Implementation costs • Actual ignition patterns and sequences used • Smoke dispersal information • Agency individual fire occurrence form • Post-burn report • NEPA documentation • Permits 	<p>9-13-RX341-PPT</p>
<p>REVIEW UNIT OBJECTIVES.</p> <p>COMPLETE THE FOLLOWING:</p> <ul style="list-style-type: none"> • Administer Day 3 Quiz (students can use their reference material for the quiz). Allow 30 minutes for completion then collect quizzes. • Have students work on the elements of the burn plan that were just covered in class. 	<p>9-14-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 10 – Final Complexity Rating

Time 1.5 Hours

Objectives

1. From the NWCG Prescribed Fire Complexity Rating System Guide:
 - a. Describe how to develop the summary complexity rating and the rationale for that rating.
 - b. Describe the process of finalizing the Complexity Analysis.

Strategy

This unit is a followup to the preliminary complexity analysis completed in Unit 4. Students complete a final complexity analysis based on their preliminary complexity analysis and other elements of the Red Bull Prescribed Fire Plan. Students also complete final complexity analysis ratings and rationale.

Important: Ensure information regarding question 7 of the Day 4 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- ☐ Red Bull Prescribed Fire Plan
- ☐ Instructors may provide completed summary complexity rating examples to aid in student learning.

Exercise

- Final Complexity Analysis (pages 10.7 – 10.8)

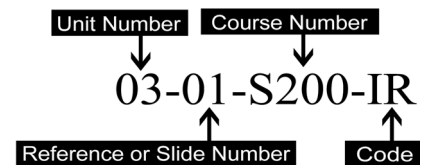
Outline

- I. Complexity Analysis Completion
- II. Instructions/Process

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

IG – Instructor Guide	IR – Instructor Reference
SW – Student Workbook	SR – Student Reference
HO – Handout	PPT – PowerPoint



UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 10 – Final Complexity Rating

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	10-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	10-2-RX341-PPT
I. COMPLEXITY ANALYSIS COMPLETION	10-3-RX341-PPT
<ul style="list-style-type: none">• Reevaluate elements and factors, and complete final ratings and rationale on the worksheet for each element.• Complete the summary rating for each factor (risk, potential consequences, and technical difficulty) to assist in assigning overall project complexity rating.• Document the summary rating rationale.	
II. INSTRUCTIONS/PROCESS	10-4-RX341-PPT
A. Final Value Determination of Factors for the Elements	
<p>Near completion of the prescribed fire planning phase, the complexity analysis elements are again rated against risk, potential consequences, and technical difficulty factors on the same form, using the same analysis process, and circling the final rating in the space provided.</p> <p>Again, local management judgment and experience are called for.</p>	

OUTLINE	AIDS & CUES
<p>Items that can't be mitigated are clearly identified in the final complexity rationale and may influence the final complexity determination.</p> <p>The final determination is based on reevaluating the elements after the plan is prepared.</p> <p>Mitigation measures should lower the final rating. In some instances, information learned during the planning process may actually increase the final rating.</p> <p>In some situations, the rating may stay the same. The rationale for each value in the final rating should describe the mitigation measures or new information that resulted in a change from the initial rating.</p> <p>For values that don't change between preliminary and final, indicate 'no change.'</p> <p>A primary concern in this step is documenting elements that have been changed from the preliminary rating because of planned mitigation, site conditions, or other situations that have occurred.</p> <p>Document the steps taken to mitigate risk and how those steps actually lowered risk. The final element ratings provide the foundation for the summary rating.</p>	<p>10-5-RX341-PPT</p>
<p>DISCUSS THE EXAMPLE ON SLIDE 6.</p>	<p>10-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="272 281 846 321">B. Summary Rating Determination</p> <p data-bbox="175 365 1024 447">EMPHASIZE IMPORTANCE OF THE SUMMARY RATING DETERMINATION RATIONALE.</p> <p data-bbox="367 495 943 577">Recognize that complexity rating is an inherently subjective process.</p> <p data-bbox="367 625 976 749">Only a few elements can be objectively measured and assigned clear breakpoints between low, moderate, and high.</p> <p data-bbox="367 798 1049 963">The complexity analysis element descriptions were designed to minimize subjectivity. Supporting documentation also aids in minimizing subjectivity.</p> <p data-bbox="367 1012 1057 1215">To develop final summary ratings by complexity factors, look over all the elements. Each project usually has elements and complexity factors that are critical to project success.</p> <p data-bbox="367 1264 1081 1470">Use lessons learned from previous projects to help with summary ratings. The values of critical elements should be given greater weight in deciding what the overall summary rating will be.</p> <p data-bbox="367 1518 1068 1684">The summary complexity rating rationale will clearly justify the summary rating for prescribed fire organization and prescribed fire burn boss level.</p> <p data-bbox="367 1732 1068 1894">It must also identify risks from the complexity analysis that are rated high, cannot be mitigated, and provide a discussion of the risks associated.</p>	<p data-bbox="1117 281 1378 321">10-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>Generally, since all mitigating measures have been applied, the highest rating from the value of any single element may provide the foundation for the summary rating of risk, potential consequences, and technical difficulty.</p> <p>The rationale for the summary rating should be brought forward from the elements that establish that rating level.</p> <p>The completed complexity analysis should be included in the package sent to the technical reviewer.</p>	<p>10-8-RX341-PPT</p>
<p>C. Agency Administrator Approval</p> <p>The summary complexity rating and rationale for the project provides the administrator critical facts to make a decision.</p> <p>For anything unique or abnormal about a project, brief the agency administrator prior to submitting for approval.</p> <p>The administrator reviews the rating material and, if in concurrence, approves and dates the document.</p> <p>Include the summary page and rationale in the final prescribed fire plan as element #3.</p>	<p>10-9-RX-341-PPT</p>

OUTLINE	AIDS & CUES
<p>EXERCISE: Final Complexity Analysis</p> <p><u>Overview:</u> This exercise is a continuation of the Unit 4 Preliminary Complexity Analysis exercise.</p> <p><u>Time:</u></p> <ul style="list-style-type: none"> • Part 1: 20-30 minutes • Part 2: 30 minutes <p><u>Format:</u> Work groups</p> <p><u>Part 1:</u></p> <ol style="list-style-type: none"> 1. Refer students back to the preliminary complexity analysis elements they completed in Unit 4. 2. Instruct groups to complete the final rating and rationale for the elements they were assigned in Unit 4. <p>Note: Students <u>should not</u> view the electronic copy of the Red Bull Prescribed Fire Plan.</p> <ol style="list-style-type: none"> 3. Have groups present their final element complexity determination and rationale to the class. 4. Allow time for instructor and student comments and questions after each presentation. <p><u>Part 2:</u></p>	<p>10-10-RX341-PPT</p>
<ol style="list-style-type: none"> 1. Show the completed complexity analysis summary for the Red Bull Prescribed Fire Plan on slide 11. 2. Groups are to complete the complexity rating summary on page 10.7 in their Student Workbook. 3. Have groups present their final complexity rating summary and rationale to the class. 	<p>10-11-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>4. Allow time for instructor and student comments and questions after each presentation.</p> <p><u>End of Exercise.</u></p> <p>REVIEW UNIT OBJECTIVES.</p>	<p>10-12-RX341-PPT</p>

UNIT OVERVIEW

Course Prescribed Fire Plan Preparation, RX-341

Unit 11 – Reviews, Approvals, and Signature Page

Time 30 minutes

Objectives

1. Describe the prescribed fire plan review and approval process.
2. Explain the amendment process.
3. Describe the importance and process of the Agency Administrator Pre-Ignition Approval Checklist and the Prescribed Fire Go/No-Go Checklist.

Strategy

This unit describes the prescribed fire plan review, amendment, and approval process. The Agency Administrator Pre-Ignition Approval Checklist and Prescribed Fire Go/No-Go Checklist are also explained.

Important: Ensure information regarding question 9 of the Day 4 Quiz is thoroughly covered during this unit.

Instructional Method

- Lecture with classroom discussion

Instructional Aids

- Computer with LCD projector and presentation software

Reference Materials

- ☐ Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

Evaluation Method

- Day 4 Quiz (make one copy per student; located in Appendix D).

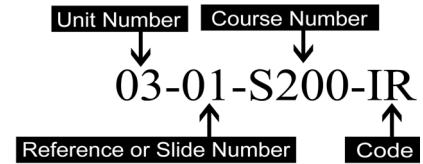
Outline

- I. Review and Approval Process
- II. Amendments
- III. Agency Administrator Pre-Ignition Approval Checklist and Prescribed Fire Go/No-Go Checklist

Aids and Cues Codes

The codes in the Aids and Cues column are defined as follows:

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UNIT PRESENTATION

COURSE: Prescribed Fire Plan Preparation, RX-341

UNIT: 11 – Reviews, Approvals, and Signature Page

OUTLINE	AIDS & CUES
UNIT TITLE SLIDE.	11-1-RX341-PPT
PRESENT UNIT OBJECTIVES.	11-2-RX341-PPT
I. REVIEW AND APPROVAL PROCESS	11-3-RX341-PPT
A. Signature Page	
1. The signature page should include:	
• Administrative unit name	
• Prescribed fire unit (burn unit/ project name)	
2. At a minimum, three dated signatures are required:	
• Prescribed fire plan preparer	
• Technical reviewer	
• Agency Administrator	
Additional signatures may be included as required by the individual unit.	
3. Final determined complexity rating(s)	

OUTLINE	AIDS & CUES
<p>B. Technical Review</p> <p>Every prescribed fire plan must receive a technical review.</p> <ul style="list-style-type: none"> • Agency or individual unit policy may dictate additional reviews. • Interagency prescribed fire plans require approval from all appropriate Agency Administrators and a technical review. • The technical review is a required and necessary step in plan development. 	<p>11-4-RX341-PPT</p>
<p>C. Technical Reviewer/Prescribed Fire Plan Preparer Qualifications</p> <ul style="list-style-type: none"> • Must be qualified or have been previously qualified as a prescribed fire burn boss at an experience level equal to or higher than the complexity being reviewed. <ul style="list-style-type: none"> – Either the prescribed fire plan preparer <u>or</u> the technical reviewer must be currently qualified, <i>less physical fitness requirements</i>. This allows qualified people who may be injured, or temporarily unable to pass the physical fitness requirements, perform as technical reviewer. – NWCG qualifications are accepted. – Only a prescribed fire burn boss Type 1 (RXB1) can review plans at high complexity. 	<p>11-5-RX341-PPT</p> <p>11-6-RX341-PPT</p>

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> – An RXB2 can review plans of moderate to low complexity. – An RXB3 is not allowed to function as a technical reviewer. • The technical reviewer should have local knowledge of the area, experience burning in similar fuel types, or conduct an on-site review. <ul style="list-style-type: none"> – Must be someone other than the primary preparer of the plan. – Off-unit technical reviews provide an additional independent perspective. – Specialists may review certain portions of the plan. <p>Example: A fire behavior analyst may review the fire behavior calculations, the aviation manager may review the air operations plan, or a resource specialist may review impacts to their resource of interest.</p> – A primary technical reviewer must be designated as the signatory. – It is recommended that at least once every year, each unit send a moderate or high complexity prescribed fire plan off-unit for technical review. 	<p>11-7-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>D. Technical Reviewer Responsibilities</p> <ul style="list-style-type: none"> • Ensure that prescribed fire plans meet agency policy and direction. • Ensure that the complexity analysis accurately represents the project. • Check the prescription parameters against the fuel types. • Ensure the fire behavior calculations and prescription parameters are appropriate and within the acceptable range. • Ensure that the ignition, holding and contingency plans are consistent with the predicted fire behavior. • Complete and sign the technical review checklist and the prescribed fire plan signature page. 	
<p>II. AMENDMENTS</p> <p>Amendments are changes to the prescribed fire plan that require an Agency Administrator signature.</p>	11-8-RX341-PPT
<p>A. Common Reasons for Amendments</p> <ul style="list-style-type: none"> • Changes to objectives. • Changes to fire behavior prescription parameters. • Changes to project area boundaries resulting in either increase or decrease in area. 	11-9-RX341-PPT

OUTLINE	AIDS & CUES
<ul style="list-style-type: none"> • Reduction in resource capabilities identified as required in the plan. • Major changes to ignition methods: <ul style="list-style-type: none"> – Ground ignition to aerial ignition. – Aerial ignition to hand ignition. – Hand drip torch ignition to use of terra torch ignition (includes ATV-mounted ignition devices). – Hand ignition from roadways to hand ignition from boats or other watercraft. 	
<p>B. The Amendment Process</p> <ul style="list-style-type: none"> • Fix the problems. • Discuss the need for a technical review with your Agency Administrator. <p>If your Agency Administrator determines a technical review is not required, a justification statement must be made and included as part of the prescribed fire plan amendment.</p> <ul style="list-style-type: none"> • If required, get a new technical review. • Re-sign signature page. 	<p>11-10-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="289 279 764 321">C. Planning With Flexibility</p> <p data-bbox="383 363 1089 447">All acceptable options should be covered in the plan prior to signature.</p> <p data-bbox="383 489 651 531">This may include:</p> <ul data-bbox="383 573 1089 961" style="list-style-type: none"> <li data-bbox="383 573 846 615">• Different seasonal burning <li data-bbox="383 657 1089 699">• Multiple prescribed fire complexity ratings <li data-bbox="383 741 789 783">• Multiple organizations <li data-bbox="383 825 894 867">• Using wetlines or snow banks <li data-bbox="383 909 565 951">• Others? <p data-bbox="383 1003 1045 1087">Even with built-in flexibility, there may be a need to make amendments to the plan.</p> <p data-bbox="383 1129 997 1255">When building flexibility, the range of identified options must remain within the scope of the complexity analysis.</p> <p data-bbox="383 1297 1097 1381">Examples of flexibility can be found on page 16 of “The Guide.”</p>	<p data-bbox="1130 279 1409 321">11-11-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p data-bbox="180 279 1117 405">III. AGENCY ADMINISTRATOR PRE-IGNITION APPROVAL CHECKLIST AND PRESCRIBED FIRE GO/NO-GO CHECKLISTS</p> <p data-bbox="277 447 1117 531">A. Agency Administrator Pre-Ignition Approval Checklist</p> <ul data-bbox="375 573 1117 1602" style="list-style-type: none"> <li data-bbox="375 573 1117 741">• Evaluates whether compliance requirements, prescribed fire plan's elements, and internal and external notification have been completed. <li data-bbox="375 783 1117 909">• Expresses the Agency Administrator's intent to implement the prescribed fire plan. <li data-bbox="375 951 1117 1035">• An Agency Administrator may add items to the checklist. <li data-bbox="375 1077 1117 1602"> <p data-bbox="440 1203 1117 1371">Establishes the expiration date of the implementation of the prescribed fire plan.</p> <p data-bbox="440 1203 1117 1371">If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval is required.</p> <li data-bbox="375 1413 1117 1602">• An 'acting' Agency Administrator may sign the Agency Administrator pre-ignition approval checklist, if authority to do so has been delegated. 	<p data-bbox="1117 279 1442 321">11-12-RX341-PPT</p>

OUTLINE	AIDS & CUES
<p>B. Prescribed Fire Go/No-Go Checklist</p> <ul style="list-style-type: none"> • The Prescribed Fire Go/No-Go Checklist from “The Guide” is a minimum standard. You can add items to the checklist. • For all multiple-day prescribed fires, a separate daily Prescribed Fire Go/No-Go Checklist is required (must be signed for implementing separate prescriptions regardless of the complexity). 	11-13-RX341-PPT
<p>REVIEW UNIT OBJECTIVES.</p> <p>COMPLETE THE FOLLOWING:</p> <ul style="list-style-type: none"> • Administer Day 4 Quiz (students can use their reference material for the quiz). Allow 30 minutes for completion then collect quizzes. • Have students work on the elements of the burn plan that were just covered in class. 	11-14-RX341-PPT