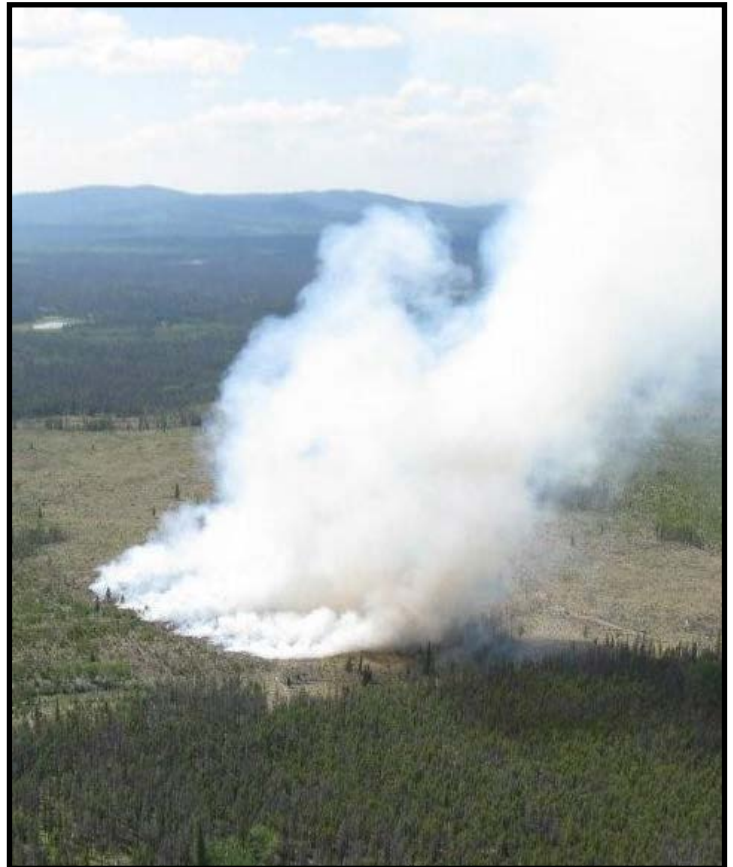




S - 241 (for the
Province of BC)

Fire Assessment

**INSTRUCTOR'S
MANUAL**



S-241 (BC)

Fire Assessment

INSTRUCTOR'S MANUAL

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Resource Operations**



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Errors and omission:

Great effort has been made to ensure that the material contained within the *S-241 Fire Assessment* course is complete and factual, however errors may still exist. Please email any comments to Forests.ProtectionBranchOffice@gov.bc.ca.

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Thank you to the BC Wildfire Service employees and forest industry personnel who reviewed and revised the subsequent copies of the S-241 course.

Initial Course content developed by:

- Kelly Johnston: Wildland Solutions
- Don Mortimer: Fireline Consulting and Instruction

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APPENDIX A - INSTRUCTOR'S SUPPLIES LIST

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1. COURSE OVERVIEW

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Introduce all course instructors to the class and ask for trainee names out loud. Have everyone in the class give a brief background if there is time, and if the trainees are comfortable.</p> <p><u>Discuss the evaluation process and provide expectations for the trainees. Goal: to complete all sections of the trainee manual prior to the Fire Assessment Activity.</u></p> <p>Ask the trainees what they already know about fire assessment.</p> <p>Ask the class: are there any questions before moving on?</p>	<p>Course Learning Objective</p> <p>Upon completion of this course, the trainee will develop the working knowledge and the ability required to complete and deliver an accurate fire assessment.</p> <p>Course Outline The British Columbia Wildfire Service S-241 Fire Assessment course is a four hour training session taught in a lecture format.</p> <p>Evaluation Individuals will be evaluated on this course using the following criteria:</p> <ul style="list-style-type: none"> • Written Exam (30 minutes at the end of the day) 70 % • Fire Assessment Exercise 30 % <p>A final combined mark of 70 % will be required for successful completion.</p>

2. INTRODUCTION TO FIRE ASSESSMENT

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Ask the class: can anyone explain the 10 AM Concept?</p> <p>Ask the class: what would a Crew Leader look for during a fire assessment?</p> <p>Ask the class: who completes a Fire Assessment during an initial attack fire?</p>	<p>Section Learning Objectives</p> <p>Upon completion of this section, the trainee will develop an understanding fire assessment application by learning:</p> <ul style="list-style-type: none"> ✓ What a fire assessment is; ✓ When a fire assessment is done; ✓ Why a fire assessment is done; ✓ Who performs a fire assessment; ✓ A Fire Assessment versus an Initial Fire Report (IFR); ✓ Who receives a fire assessment? <p>Wildfires in BC</p> <p>Over the past 10 years:</p> <ul style="list-style-type: none"> • There have been 2000 wildfires per year. • Burn close to 115000 hectares (ha). • 61 % caused by lightning. • 39 % are human caused. <p>10 AM Concept</p> <ul style="list-style-type: none"> • Effort to control wildfires by 10:00 a.m. the next day • Start of high temps and low humidity • Over 92 % of fires controlled within 24 hours at less than 4 hectares. <p>What is a fire assessment?</p> <ul style="list-style-type: none"> • All values at risk. • Present and expected fire behaviour (fuels, weather, topography). • Fire potential. • Resources required for suppression. • Best plan of attack. • Fire hazards and crew safety issues. <p>When are fire assessments done?</p> <ul style="list-style-type: none"> • As soon as you get to the wildfire. • When a fire related factor changes (e.g. weather, fire behaviour, equipment breakdowns, production rates, change in priorities, etc.). • When you (as the Incident Commander) need to be updated about the fire activity. • When your supervisor needs to know how the incident is developing.

<p>Give a brief description of the RWCO and this individual's role.</p> <p>Explain the role of the ZWCO.</p> <p>Explain the difference between an IFR and a Fire Assessment. Why is this not the same?</p> <p>Describe the RWCO and ZWCO working together to ensure Fire Zone Priorities.</p> <p>Ask the class: will a rookie crew member ever be asked for a fire assessment? When and why?</p> <p>Ask the trainees to provide feedback on the following questions: why is fire assessment a continuous process? Who are the Duty Officers? Who performs a Fire Assessment?</p>	<p>Why are fire assessments done?</p> <ul style="list-style-type: none"> • Ensure that the RWCO has the most current fire information. • Provide the RWCO with an accurate estimate for the amount and type of suppression resources required. • Are useful in establishing priorities when multiple fire starts occur and/or when initial attack efforts are failing on several fires ('fire bust' situations). • Ensure that suppression resources are allocated effectively. <p>A Fire Assessment vs. An Initial Fire Report</p> <ul style="list-style-type: none"> • Fire assessments on a fast spreading fire may be numerous - updated and communicated to the Duty Officer frequently as the fire situation changes. An IFR is done only once on a fire. • A fire assessment may be provided with the IFR. This is not unusual when experienced fire personnel provide the IFR. However, not all persons providing IFRs have sufficient fire experience or training to provide a fire assessment. The IFR contains information that is important to a fire assessment, so it will be covered in detail later in the course. <p>Who performs fire assessments?</p> <ul style="list-style-type: none"> • Incident Commander • Air Patrol Crews • Experienced Firefighters • The quality of fire assessments varies with experience. <p>Who receives fire assessment information?</p> <ul style="list-style-type: none"> • Fire assessment information is provided to the Fire Centre Duty Officer as a standard procedure. • The same information should also be communicated to firefighting crews on the fire so they can work safely. <p>Questions for Assessment of Learning</p>
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3. ROLES AND RESPONSIBILITIES

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Describe exactly what trainees need to know from this section.</p> <p>Explain why the values at risk are a key component of fire assessment in terms of priority fire targets.</p> <p>Discuss the importance of being prepared before a wildfire is reported to the Fire Centre.</p> <p>Describe how your observations while travelling to the fire may affect the fire assessment.</p>	<p>Section Learning Objectives</p> <p>Upon completion of this section, the trainee will develop an understanding of the fire assessment roles and responsibilities by examining:</p> <ul style="list-style-type: none"> ✓ The various individuals who may be required to complete a fire assessment; ✓ The responsibilities of an individual when conducting a fire assessment; ✓ The specific objectives an individual must meet while performing a fire assessment before and after arrival at the fire as well as throughout a fire; ✓ The responsibilities of the RWCO and ZWCO receiving the fire assessment information; ✓ The attack priorities during situations with multiple new fires; ✓ Decision options if control objectives are not met. <p>Experienced Firefighters An IC or Duty Officer may request an assessment by experienced personnel if:</p> <ul style="list-style-type: none"> • Control difficulties • Significant values are at risk • Fire without ground crews <p>Responsibilities When Performing a Fire Assessment Be Prepared: Be prepared to take on the responsibility of conducting a fire assessment. Organize and prepare for all fire assessment tasks (IFR pad, notepad, pens, compass, etc.). Be Thorough: Perform a complete and ongoing reconnaissance of the wildfire or incidents assigned. Be Accurate: Accurately record all fire information. Communicate: Communicate fire information effectively to the RWCO and ZWCO.</p> <p>Before Arrival at the Fire</p> <ul style="list-style-type: none"> • Obtain the best available information on the location of the fire, the resources being deployed and current and forecasted weather conditions and fire behavior. • Travel by a route that will provide the best vantage point for sizing up the fire when responding to larger incidents.

<p>Ask the class: why do we need to be concerned with the public in these instances?</p> <p>Ask the class: what does the acronym 'LACES' stand for? Why is this system such an important guideline when trying to keep crews safe?</p> <p>Explain that an IAP will likely be completed verbally at this point in the fire.</p> <p>Describe the Duty Officer role as well as the difference between the RWCO and ZWCO. Fire Centre vs. Fire Zone.</p>	<ul style="list-style-type: none"> Record the description of any vehicles or people in the area or leaving the area (include direction of travel). <p>On Arrival at the Fire</p> <ul style="list-style-type: none"> Identify or review LACES and any other fireline hazards or safety concerns. Determine probable spread during the first burning period. Notify the RWCO if the resources assigned to the fire will be adequate. Give an estimate of the fire potential and additional resources required. Inventory and analyze possible environmental damages both as a result of the fire and possible fire control objectives. Develop an Incident Action Plan (IAP) - plan strategies and tactics based on current information and anticipated situations. Keep the RWCO and ZWCO informed. Determine the point of ignition if possible. Preserve evidence at in the area of ignition if possible. Investigate the cause and determine responsibility (human vs. lightning). <p>Ongoing Fire</p> <ul style="list-style-type: none"> Continuously re-assess the fire as well as weather conditions, update strategies and tactics and adjust resource requests accordingly to ensure safe and effective suppression efforts. <p>Responsibilities of the RWCO and ZWCO It is the responsibility of these Duty Officers who receive the fire assessment information includes:</p> <ul style="list-style-type: none"> Compiling all information about the fire (from the IFR and fire assessments). Leading less experienced fire personnel through the assessment process and describing different key points of interest; Developing a 'clear picture' of the incident as it has been described; Deploying the necessary resources to meet the fire suppression objectives and providing additional resources as required; Request additional support from the PWCC and contractors as required.
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<p>Reinforce the idea of values at risk during this section.</p>	<p>Multiple Fire Situations The RWCO will determine initial attack priorities after considering the pertinent information from multiple fire assessments. The RWCO will examine:</p> <ol style="list-style-type: none"> 1) The specific concerns outlined for the identified fire zones - values at risk. 2) The number of fire suppression resources available to for deployment - in the Zone and in the Fire Centre.
<p>Define a modified response fire to the trainees.</p>	<p>When the Control Objectives Are Not Met If the control objective is not met (e.g. the fire is not controlled by 10 AM the day after discovery), 1 of 2 decisions will be made by the RWCO:</p> <ol style="list-style-type: none"> 1) Continue Fire Suppression <ul style="list-style-type: none"> • The IC will determine resource requirements. • The RWCO will provide necessary support. 2) Stop Fire Suppression (for a period of time and as per a Fire Analysis) <ul style="list-style-type: none"> • Determine location of containment lines. • Monitor the fire behaviour. • If fire approaches containment lines, a decision must be made to mobilize resources. <p>The RWCO will provide the necessary support</p>
<p>Give examples of why you would stop fire suppression.</p>	<p>Questions for Assessment of Learning</p>
<p>Ask the trainees to provide feedback on the following questions: what are your 4 responsibilities when performing a fire assessment? Who is responsible for compiling information at the Fire Centre? Who will prepare additional resources for an incident from the Fire Zone? How will wildfires be prioritized?</p>	

4. FIRE BEHAVIOUR

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Discuss the fact that firefighters need a solid understanding for fire behaviour prior to completing an accurate fire assessment.</p> <p>Reinforce the learning objectives in this section.</p> <p>In order to successfully fight forest fires, we must first understand what factors make a fire grow in size.</p> <p>Ask the class: what happens if 1 of these elements is removed? Explain how each can be eliminated.</p>	<p>Section Learning Objectives Upon completion of this section, the trainee will have a basic understanding of the following aspects of wildland fire behavior:</p> <ul style="list-style-type: none"> ✓ The basic arrangement of forests and fuels in the wildland fire environment; ✓ The 3 elements of the fire triangle; ✓ The 3 key factors that influence fire behavior: the 30/30 Crossover concept; ✓ The main components of the Canadian Forest Fire Danger Rating System; ✓ The 4 fire types as well as candling and spotting; ✓ The Fire Intensity Ranking System; ✓ The parts of a wildfire. <p>Forest Layers A typical forest consists of a plant community dominated by trees growing on a forest floor.</p> <ul style="list-style-type: none"> • Canopy • Understory • Duff • Mineral Soil <p>FOREST FUELS Any materials that will ignite and combust (burn) are considered to be a fuel. There are 3 types of fuel in wildfires:</p> <ul style="list-style-type: none"> • Aerial • Surface • Ground <p>THE FIRE TRIANGLE</p> <p>3 elements: <i>fuel</i>, <i>oxygen</i> and <i>heat</i> must be present to start and maintain a fire.</p> <p>In a wildland fire:</p> <ul style="list-style-type: none"> • the forest provides the fuel; • there is oxygen in the air; and • heat is produced naturally by lightning strike or is introduced by humans.

<p>Ask the class: how is heat transferred after a fire has started? Not on slides.</p> <p>Give a brief explanation of the 3 factors.</p>	<p>The Heat Transfer Process</p> <ul style="list-style-type: none"> • Radiation • Convection • Conduction <p>FACTORS INFLUENCING FIRE BEHAVIOUR</p> <p>There are 3 key factors that influence fire behaviour. The following is a list of factors:</p> <p>Fuel</p> <ul style="list-style-type: none"> • Moisture • Size • Spacing • Loading <p>Weather</p> <ul style="list-style-type: none"> • Wind • Precipitation • RH • Temperature <p>Topography</p> <ul style="list-style-type: none"> • Slope • Aspect • Terrain • Elevation <p>FUEL</p> <p><i>Fuel Moisture</i></p> <p>Is the single most important fuel related factor affecting fire behaviour. A fire will ignite easier and spread faster in fuels with lower fuel moisture.</p> <p>Dead and dry fuels.</p> <p><i>Fuel Size</i></p> <ul style="list-style-type: none"> • Heavy slow-burning fuels • Light, fast-burning fuels <p><i>Fuel Spacing (Continuity)</i></p> <ul style="list-style-type: none"> • Horizontal • Vertical • Continuous vs. Patchy <p><i>Fuel Loading</i></p> <p>Refers to the weight or mass of fuels in a given area.</p> <ul style="list-style-type: none"> • in tons per hectare.
<p>Explain why fuel moisture is so significant during the fire assessment. Fuels adjacent to the fire will ignite readily if dry.</p> <p>Describe how fire reacts to each size of fuel.</p> <p>Explain fuel spacing and the difference between continuous and patchy.</p>	

<p>Explain why wind is such a critical factor on all wildfires.</p> <p>How does it affect small vs. large fuels? Which will dry out quicker?</p> <p>Ask the class: explain 30/30 Crossover to the class. Why is this concept an important factor to consider during a fire assessment?</p> <p>Describe how slow fighting fires on extreme slopes can be for fire personnel.</p> <p>Ask the class: why is topography a crucial aspect to discuss when completing a fire assessment?</p>	<p>Weather</p> <p><i>Wind</i> Is the single most important weather factor affecting fire behaviour, and wind influences fire activity by:</p> <ul style="list-style-type: none"> • Decreasing fuel moisture. • Bending the flames ahead of the fire. • Carrying sparks and embers. • Feeding more oxygen to a fire. • Driving the direction of a fire. <p><i>Precipitation</i> Influences fire behaviour by affecting fuel moisture.</p> <p><i>Relative Humidity</i> Influences fire behaviour by affecting fuel moisture.</p> <p>Relative humidity is the percentage of water vapour present in the air.</p> <p><i>Temperature</i> Fluctuations affect relative humidity, thereby affecting fuel moisture content. To a lesser degree, temperatures also influence the amount of preheating required to bring a fuel to its ignition point.</p> <p>The 30/30 Crossover</p> <p>Topography</p> <ul style="list-style-type: none"> • Slope • Aspect • Terrain • Elevation <p><i>Slope</i> Is the single most important topographical factor affecting fire behavior and spread rates.</p> <ul style="list-style-type: none"> • Flames are closer to fuels above. • Fuels are preheated by convection. • Winds carry brands uphill. • Burning debris rolls downhill. <p><i>Aspect</i> Refers to the direction the slope faces. For example, a southwest aspect is a slope that faces southwest.</p> <ul style="list-style-type: none"> • Southern slopes get the most sunlight. • Fine, flashy fuels on these slopes. • Lowest fuel moistures.
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<p>Briefly explain these systems.</p> <p>Ask the class: what weather readings are used in the FWI? How many fuel moisture codes are in the FWI? What is the ISI? What does the BUI represent?</p> <p>Explain the significance of each code in relation to ease of ignition.</p>	<p><i>Terrain</i> Terrain is the variation in land features, which primarily affects fire behaviour by altering wind direction and speed in certain locales.</p> <ul style="list-style-type: none"> • Turbulence or 'eddies.' • Terrain restrictions. • Steep-sided gullies or canyons. <p><i>Elevation</i> Typically, air temperatures follow an elevation gradient with temperatures being warmer at lower elevations and cooler at higher elevations.</p> <ul style="list-style-type: none"> • Inversions • Thermal Belts <p>The Canadian Forest Fire Danger Rating System (CFFDRS) Is a standard national system of rating fire danger in Canada. The fire potential and fire spread rates are used to determine daily fire preparedness levels and suppression requirements for the various Fire Centre operations.</p> <p>Firefighters should have a general understanding of the CFFDRS and the importance of the various codes and indexes in order to understand ease of ignition, rate of spread and difficulty of control.</p> <p>The CFFDRS has 2 sub-systems:</p> <ol style="list-style-type: none"> 1. The Fire Weather Index (FWI) system. 2. The Fire Behaviour Prediction (FBP) system. <p>The Fire Weather Index (FWI) System Uses 4 weather readings, which are taken each day.</p> <ul style="list-style-type: none"> • Temperature (wet and dry bulb). • Relative Humidity. • Wind Speed and Direction. • Rainfall (cumulative - last 24 hours). <p>Fuel Moisture Codes Are numerical ratings that express daily changes in moisture content of 3 classes or layers of forest fuel.</p> <ul style="list-style-type: none"> • FFMC • DMC • DC
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<p>FFMC - small fuels and initial spread.</p> <p>DMC - moderate fuels and level of burning.</p> <p>DC - heavy fuels and deep burning into root systems and large logs.</p> <p>Ask the class: why do the ISI and BUI need to be considered during the fire assessment? Is it safe to complete a ground reconnaissance of a wildfire if the ISI is high?</p> <p>Describe fire intensity in kilowatts per meter and what this means.</p>	<p>FFMC Moisture content of ground litter and small fuels. Scale from 0 to 101. 90 and above = extremely easy ignition.</p> <p>DMC Moisture content of material 5 to 10 cm deep and medium fuels. Scale is open ended. 35 and above = these fuels will be consumed.</p> <p>DC Moisture content of material 10 to 20 cm deep and heavy fuels. Scale is open ended. 300 and above = sustained action fires with deep burning layers.</p> <p>Fire Behaviour Indexes Initial Spread Index (ISI)</p> <ul style="list-style-type: none"> Expected rate of fire spread immediately after ignition. <p>Build Up Index (BUI)</p> <ul style="list-style-type: none"> Total amount of fuel available for combustion. <p>Fire Weather Index (FWI)</p> <ul style="list-style-type: none"> Represents the potential fire intensity at the head of a fire. Fire danger levels (classified as very low, low, moderate, high or extreme) summarize predicted wildland fire conditions for a specific area. <p>The Fire Behaviour Prediction (FBP) System Predicts fire rate of spread in a given fuel type with a known ISI.</p> <p>The FBP system evaluates:</p> <ul style="list-style-type: none"> FWI indices on site or from the nearest weather station. Fuel type (17 different fuel types). Topography (slope and aspect). Time of day / time of year. <p>Primary outputs of the FBP system are:</p> <ul style="list-style-type: none"> Rate of Spread (metres per minute). Fire Type (surface, intermittent crown, crown). Fire Intensity (kilowatts per metre).
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<p>Firefighters will not be directly adjacent to any crown fires.</p> <p>Review each fire rank with the trainees. Discuss the fires in which firefighters alone would have success on and why.</p> <p>Rank 1 to 3 vs. Rank 4 to 6.</p> <p>Define these terms for the class.</p> <p>Explain the significance of this ranking system when completing a fire assessment.</p> <p>Ask the trainees to provide feedback on the following questions: what is the difference between candling and a crown fire? Describe the effects of fuel moisture, wind and slope on a wildfire. Why is fire behaviour information critical for accurate fire assessment? Explain the CFFDRS information that you think will be the most helpful during a fire assessment. Why? List and describe the 3 FWI fuel moisture codes.</p>	<p>Fire Types</p> <ul style="list-style-type: none"> • Ground • Surface • Intermittent Crown • Crown <p>FIRE INTENSITY RANKING SYSTEM</p> <p>This fire ranking system is a very convenient way of quickly assessing the fire. It is important to understand the Fire Intensity Ranking System enables firefighters to communicate a summarized assessment of fire behaviour. Numbers from 1 (low) to 6 (extreme) are based on the FWI values.</p> <p>The Fire Ranks</p> <ul style="list-style-type: none"> • Rank 1 • Rank 2 • Rank 3 • Rank 4 • Rank 5 • Rank 6 <p>Parts of the fire</p> <p>Questions for Assessment of Learning</p>
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5. PREPARING FOR A FIRE ASSESSMENT

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Describe exactly what trainees need to know from this section.</p> <p>Explain that many of the resource requests for an IA fire will be based on these conditions.</p> <p>Anticipating what the fire will do during the first burning period is crucial.</p>	<p>Section Learning Objective</p> <p>Upon completion of this section, the trainee will develop an understanding for the minimum preparations requirements to adequately complete a fire assessment by learning:</p> <ul style="list-style-type: none"> ✓ The daily preparation requirements; ✓ The current fire behaviour in the area of coverage; ✓ The full range of suppression resources available and their capabilities; ✓ The equipment and materials required for fire assessment. <p>Note: An accurate fire assessment starts with preparation ahead of time.</p> <p>Weather Considerations for Fire Assessment</p> <p>Daily Fire Weather and Fire Behaviour Forecasts Review the fire weather conditions and current fire activity in your zone. Take forecasting notes on the following as part of your daily routine:</p> <ul style="list-style-type: none"> • Temperature and Relative Humidity. • CFFDRS FWI values (13:00 hours) from the weather stations in your area. Know the location of these weather stations as you can choose the values that most closely represent any fires you assess. • Any changes in wind speed and direction. • Possible cold front and thunderstorm development and activity. • Approaching frontal systems • All Fire Behaviour Advisories issued. <p>The fire weather forecasts and other weather information are received daily from the Weather Forecaster at a Fire Centre.</p> <p>This information can be obtained through the RWCO or Fire Centre Dispatch.</p> <ul style="list-style-type: none"> • The 13:00 PDT fire weather readings and indexes are updated daily between 13:30 and 14:30 PDT. • Fire weather forecasts are issued twice daily at 07:30 and 13:30 hours.

<p>Ask the class: why is knowledge of the current fire behaviour in your Zone helpful?</p> <p>Ask the class: what kind and type of resources an IA crew leader may ask for on a 2 ha fire with Crossover expected?</p> <p>Ask the class: what 2 pieces of heavy equipment are used for control line construction? What are the 2 speciality crews used in British Columbia (not IA or UC)? When are these crews used?</p> <p>Reinforce that all necessary equipment and materials must be prepared in advance.</p>	<p>Current Fire Behavior in your Area There may be a number of active wildfires in the area. You should know about the fire behavior and any control difficulties these fires are experiencing.</p> <p>Resources Available and Capabilities The BC Wildfire Service has a wide variety of suppression resources available to throughout the 6 Fire Centres. The Zone Duty Officer is an excellent source of resource information and all heavy equipment contacts as well as industry contract crews will be made available upon request. You should know the capabilities and limitations of the resources listed below:</p> <ul style="list-style-type: none"> • Air Tankers • Helicopters • Heavy Equipment • Specialty Crews • Water Delivery Systems • Sustained Action Crews <p>The availability of suppression resources should not be an immediate concern of the person doing the fire assessment. If something is required, it should be requested as soon as possible.</p> <p><i>Never assume a resource is unavailable. Always ask for it if you need it.</i></p> <p>Equipment and Materials Required for Fire Assessment You must have a fire assessment kit adequately stocked and ready to go if you are on standby. All of your required items should be in a kit that can be used for assessments done from the air or ground. Check your kit and ensure everything is functioning properly at the beginning of your shift.</p> <p>The following items will be required to ensure a fire assessment is done properly:</p> <ul style="list-style-type: none"> • Map kit with 1 to 600000 and 1 to 250000 map sheets of the area. • Pens, pencils and a ruler. • A pad of FS-260: Initial Fire Reports. • A clipboard with note paper and a Fire Assessment Checklist. • Flagging tape and/or ticker tape to paper trail the fire. • A hand-held GPS unit and a radio.
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<p>Explain the importance of having a Red Book when making fire assessment updates.</p>	<p>Additional items that should be taken if available include:</p> <ul style="list-style-type: none"> • Air photos or Vegetation Resource Inventory (VRI) maps of the fuel types surrounding the fire. • CFFDRS FBP System Field Guide (need knowledge of how to use it). • A completed IFR for the fire if already done. • A digital camera with extra batteries and memory card. • A digital video camera to record fire behaviour.
	<p>On Route to the Fire</p> <p>If you have time before you go to assess a fire, find an air photo and a vegetation resource inventory map of the general fire location. The information this material provides may be useful in completing the assessment.</p>
	<p>While you are on route to the fire become as familiar as possible with the fire area. Get topographic maps out and study all available information. Complete as much paperwork as possible in advance. You will have a much better idea of what to expect at the fire by doing the preparation work in advance.</p>
	<p>You should be predicting expected fire behaviour based on knowledge of the indices: FFMC, ISI, BUI, CFFDRS Fuel Type and FWI.</p>
<p>Ask the trainees to provide feedback on the following questions: what 2 pieces of information are critical to know when preparing for a fire assessment? When should you ask for resources? Should you ever delay this request? Why is it necessary to take detailed notes? Should you try to remember your fire assessment observations?</p>	<p>Be prepared to take detailed notes about what you see when you get into visual range of the wildfire.</p> <p>Questions for Assessment of Learning</p>

6. CONDUCTING THE FIRE ASSESSMENT

Teaching Aids/Cues	Outline of Significant Course Content
Use Power Point presentation with appropriate slides. Describe exactly what trainees need to know from this section.	<p>Section Learning Objective</p> <p>Upon completion of this section, the trainee will demonstrate an understanding of the key components involved in successfully conducting and transmitting an accurate fire assessment. The trainee will learn the following information in order to complete a written assignment:</p> <ul style="list-style-type: none"> ✓ The general considerations when conducting fire assessments. ✓ The initial communications to the Fire Centre Dispatch; ✓ Transmitting the IFR to the RWCO and ZWCO; ✓ How to do a reconnaissance or ‘Recce’; ✓ Completing the Initial Fire Report; ✓ The fire assessment. <p>General Considerations When conducting a fire assessment:</p> <ul style="list-style-type: none"> Remain calm - complete the task carefully and methodically. Check your location - if you have been dispatched to a particular fire then be sure you are on the right fire. There may have been multiple fire starts in the same general area. Use common sense - size-up, develop objectives and order your resources based on the objectives. Use Adaptive management - re-evaluate the situation on a regular basis and re-adjust the resources you request as needed. Do not avoid decisions - if you are unsure, ask for input from other team members including the RWCO or a direct supervisor. Communicate - the fire assessment information to the crews on the fire. This will help them complete fire suppression assignments safely and effectively. <p>Initial Communications to the Fire Centre Immediately notify the Fire Centre Dispatch and have the rough geographical location passed on to the RWCO.</p> <p>Do not wait until you have completed an IFR.</p>
Ask the class: why must you provide the Fire Centre with your location during your initial call to dispatch?	

<p>Communicate the sample transmission out loud to the class. Use additional comments or information as needed. Base this on personal experience.</p> <p>Ask the class: why is it a good idea to get the latitude and longitude of a fire in a multi fire scenario?</p> <p>Ask the class: why is a good reconnaissance of the fire area is important?</p> <p>Explain that you will be able to make as many passes as necessary in order to complete a thorough fire assessment. Not just 2 total.</p>	<p>Sample Radio Transmission <i>"Prince George Fire Centre. Prince George Fire Centre. This is NIFAC 72 Alpha with a fire report. Are you ready to copy?"</i></p> <p><i>Wait for response and then continue...</i></p> <p><i>"I have located a small (or large), fast (or slow) moving wildfire 1 kilometre north of Gwillim Lake, approximately 300 metres west of a Forest Service Road. It is putting off white smoke. Please standby for an IFR and fire assessment."</i></p> <p>A prompt notification alerts the RWCO and provides a general location so suppression resources can be dispatched immediately.</p> <p>Proceed to the fire after spotting the smoke and relaying the initial information in order to start a reconnaissance of the fire. Complete the Initial Fire Report and fire assessment that will be transmitted to the Fire Centre and Zone.</p> <p>Fire Reconnaissance or 'Recce' From an Aircraft</p> <ul style="list-style-type: none"> • Brief the pilot on what you are looking for and how you want to proceed. • The aircraft should be flown so that the person assessing the fire (not the pilot) has the best possible view of the incident. • It is important to record every observation as soon as they are noted. Do not rely on memory. • Have a crew member take photos. <p>1. Fly High on the First Pass</p> <ul style="list-style-type: none"> • Fly at 1000 to 2000 feet to see whole fire. • The initial call to the Fire Centre should be made at this time. <p>2. Fly Low on the Second Pass</p> <ul style="list-style-type: none"> • Fly a few hundred feet above and either way around the fire perimeter. • Avoid flying so low that rotor downwash from the helicopter fans the fire and increases fire spread. • Observe details regarding fire activity, topography, fuels, water sources and access for crews with heavy equipment.
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<p>Reinforce the issue of writing notes and not relying on your memory while completing an assessment. This information needs to be passed on and the RWCO relies on the accuracy of many details.</p> <p>Discuss why the IFR is broken down into sections based on the phonetic alphabet.</p> <p>Explain that the lines of latitudes (parallels) run east and west while lines of longitude (meridians) run north and south.</p>	<ul style="list-style-type: none"> Record the description of any vehicles or people in the area or leaving the area including direction of travel. Take the time to have an excellent look at the fire. <p>On the Ground (at the fire) Aerial reconnaissance is followed up by ground reconnaissance, which occurs when firefighters arrive at the fire. This is usually completed by the initial IC.</p> <p>Arrange to have the helicopter remain in the air over the fire (within radio range) after dropping the crew off.</p> <p>If it is safe, walk around the fire or view it from a distance. Always ensure that you continually assess for potential Escape Routes and Safety Zones as you size-up the fire.</p> <p>From a Vehicle Stop and observe on approach to the fire at a point where you can see the entire fire and surrounding area at the same time if possible.</p> <p>The Initial Fire Report (IFR) The IFR is the first report on the wildfire. An experienced firefighter will expand the IFR into a full fire assessment. Use a sample IFR to refer to as you learn about this process.</p> <p>A wildfire will be measured in hectares (ha) and distances will be described in metres (m) or kilometres (km) depending on a fire's size.</p> <p>Geographic Location Provide a brief description of the fire's location, which will be used to identify the fire if it grows to an expanded attack incident.</p> <p>Elevation This can be obtained using topographic maps, the altimeter in a helicopter or a hand held GPS unit.</p> <p>Latitude and Longitude “Lat and Long” - this universal system is used in BC to grid fire locations on all map scales. Most aircraft will have GPS units capable of displaying latitude and longitude coordinates.</p> <p>Bearing, Degree, Minute and Vertical Angle This information is supplied by fire lookouts.</p>
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<p>Explain that a single hectare is 10000 square metres (100 m x 100 m). The length and width of a fire in metres will be multiplied and divided by 10000 to get the fire size in hectares.</p>	<p>ALPHA - SIZE</p> <ul style="list-style-type: none"> ☐ 1. Single Tree ☐ 2. Spot _____ m x _____ m ☐ 3. 0.1 - 0.2 ☐ 4. 0.3 - 0.5 ☐ 5. 0.6 - 1.0 ☐ 6. 1.1 - 2.0 ☐ 7. 2.1 - 4.0 ☐ 8. 4.1 - 8.0 ☐ 9. Other _____ ha <p>Size and Distance Estimation It can be difficult to accurately estimate fire size and distance from an aircraft. Pilots will be able to help, but you are responsible for accurate estimates.</p> <p>There are 2 common methods used for estimating distances from an aircraft including:</p> <p>1. Lineal Comparison</p> <ul style="list-style-type: none"> • Use a map to check the length of a lake, runway or the distance between 2 roads. Compare this distance with the length of a fire flank. • Tree heights can also be useful on smaller fires. <p>2. Distance and Size by Flight Time - to accurately determine distance on the ground you need to complete the following:</p> <ul style="list-style-type: none"> • Have the pilot set up the aircraft to fly at a pre-determined speed. • Time the aircraft as it flies between 2 points on the fire perimeter. • Calculate the length of the flight path by simple multiplication and division. <p>Size The approximate size of larger fires may be determined once the methods of measuring distance are understood. To calculate fire size you must:</p> <ul style="list-style-type: none"> • Visualize the fire as a square, rectangle or triangle. • Fly along and measure the distance of 1 side (length) and 1 end (width) of the fire. Measure the height and base for triangle shaped fires.
<p>Review all examples from the Trainee Manual with the class.</p> <p>Explain why a 50 m by 50 m fire is not 0.5 ha. $50 \times 50 = 2500 / 10000 = 0.25$ ha.</p>	<p>Size and Distance Providing an accurate estimation of fire size is not impossible. Please remember:</p> <ul style="list-style-type: none"> • A fire 100 m x 100 m is 1.0 ha in size. • A fire 100 m x 50 m is 0.5 ha in size.

Discuss the importance of this quick visual assessment and how it relates to FBP.

BRAVO - FIRE RANK

- ☐ 1. Rank 1, Smouldering Ground Fire
- ☐ 2. Rank 2, Open Flame, No Spread
- ☐ 3. Rank 3, Vigorous Surface Fire, Moderate Spread, May See Candling
- ☐ 4. Rank 4, Moderate to Fast Spread, Short Aerial Bursts, Spotting
- ☐ 5. Rank 5, Continuous Crown Fire, Spotting Distance _____ m
- ☐ 6. Rank 6, Continuous Crown Fire, Blow-up

The Fire Intensity Ranking System enables firefighters to communicate a summarized assessment of fire behavior and can be used to describe characteristics of the fire.

CHARLIE - FUELS

- ☐ 1. Grass
- ☐ 2. Brush
- ☐ 3. Deciduous
- ☐ 4. Slash
- ☐ 5. Reproduction
- ☐ 6. Open Timber
- ☐ 7. Closed Timber
- ☐ 8. Other _____
- ☐ 9. FBP _____

This is a critical component of the IFR because knowing the fuel type the fire is burning in can help to determine how rapidly it will spread.

Ask the class: why is this section crucial information to provide for the RWCO?

DELTA- VALUES AT RISK (Immediate Threat)

- ☐ 1. Life/Property _____
- ☐ 2. Timber (Forest) Resources (Includes Reproduction) _____
- ☐ 3. Other Special Values (Watersheds, Parks) _____
- ☐ 4. Distance _____ m, N S E W of the fire

Review the Beaufort Scale with the trainees. Ask the class: why is the wind speed relevant when discussing fire assessment? How does the wind direction relate to adjacent fuels?

ECHO - WIND

- ☐ 1. Calm
- ☐ 2. Speed _____ km/h
- ☐ 3. Direction N S E W

<p>Review the significance of the fuels adjacent to the fire. Compare slash and a deciduous stand of trees.</p>	<p>FOXTROT - ADJACENT FUELS</p> <ul style="list-style-type: none"> ☐ 1. Grass ☐ 2. Brush ☐ 3. Deciduous ☐ 4. Slash ☐ 5. Reproduction ☐ 6. Open Timber ☐ 7. Closed Timber ☐ 8. Other _____ ☐ 9. FBP _____ <p>GOLF - SLOPES</p> <ul style="list-style-type: none"> ☐ 1. Flat/Rolling ☐ 2. Moderate < 30 % ☐ 3. Steep > 30 % and < 60 % ☐ 4. Extreme > 60 % <p>10 % slope - 1 metre of vertically rise for every 10 metres of horizontal distance.</p> <p>50 % slope - 1 metre of vertical rise for every 2 metres of horizontal distance.</p> <p>100 % slope - 1 metre of vertical rise for every 1 metre of horizontal distance.</p> <p>HOTEL - ASPECT</p> <ul style="list-style-type: none"> ☐ 1. North ☐ 2. South ☐ 3. East ☐ 4. West <p>The south and southwest aspects will have fine, flashy fuels that dry out rapidly due to the long durations of direct sunlight, which results in an increase in fire activity.</p> <p>INDIA - SLOPE POSITION</p> <ul style="list-style-type: none"> ☐ 1. Bottom ☐ 2. Lower Third ☐ 3. Middle Third ☐ 4. Upper Third ☐ 5. Top <p>The fire's position on a slope will indicate fuel type and timber values as well as fire potential. In addition, slope position serves as a location reference.</p>
<p>Explain that slope is equal to rise over run. The percent of the slope is calculated by dividing the rise by the run and multiplying by 100. The degrees can be determined by multiplying the percentage by 45°, which is 100 % slope.</p> <p>Ask the class: why is a fire's position on the slope critical when anticipating the fire behaviour?</p>	

<p>Ask the class: why is access to the fire important when determining resource needs?</p>	<p>JULIET - ACCESS</p> <ul style="list-style-type: none"> ☐ 1. Road _____ m ☐ 2. Heli-spot _____ m ☐ 3. Hover Exit _____ m ☐ 4. Other _____ m ☐ 5. N S E W of the fire <p>KILO - AVAILABLE WATER</p> <ul style="list-style-type: none"> ☐ 1. None ☐ 2. Adjacent ☐ 3. _____ m N S E W of the fire <p>The availability of water and proximity to the fire will determine water delivery options. This may also influence the possible fire camp locations.</p>
<p>Ask the class: what is the purpose of paper trailing a wildfire?</p> <p>Why should the IC or assessor take photos of the fire?</p>	<p>LIMA - PAPER TRAILED</p> <ul style="list-style-type: none"> ☐ 1. Yes ☐ 2. No <p>MIKE - PHOTOS</p> <ul style="list-style-type: none"> ☐ 1. Yes ☐ 2. No
<p>Why is it necessary to determine the cause of the fire?</p> <p>Explain the significance of this heading to the class. Relate this section to the need for additional resources.</p>	<p>NOVEMBER - SUSPECTED FIRE CAUSE</p> <ul style="list-style-type: none"> ☐ 1. Human ☐ 2. Lightning <p>ACTION TAKEN/RECOMMENDED</p> <p>PROBABILITY OF SUCCESS: LOW MED HIGH</p> <p>Incident Number</p> <p>Get the number of the incident from the Fire Centre when you report it.</p>
<p>Describe how an assessment should be communicated to the Fire Centre.</p> <p>Ask the class: when are fire assessments required? Is there only 1 fire assessment for an incident?</p>	<p>The Fire Assessment</p> <p>Fire Assessment Considerations</p> <p>The Initial Fire Report (IFR) is a way of communicating information about a new wildfire to Duty Officers.</p> <p>Fire assessments are another method of communicating this information and can be included in the IFR or communicated separately.</p> <p>An experienced firefighter will prepare a personal 'fire assessment checklist' with the key items written down to assist getting ready for the fire assessment efficiently and accurately.</p>

	<p>Fire Assessment Checklist</p> <p>1. Update the basic information on the fire Provide any section of the IFR information that has changed since the original was completed.</p> <p>2. Provide a summary of fire suppression activities This information is critical for Duty Officers. An accurate and thorough summary of ongoing suppression activities should be provided and updated regularly.</p> <p>Resources on the fire - firefighters, equipment, dozers, skidders, tenders, pumps, helicopters, etc.</p> <ul style="list-style-type: none"> • Control line locations and types • Resources required • Control problems (resistance to control) • Anticipated time of control • Recommended action in the event of initial attack failure <p>3. Safety Concerns Danger areas: dangerous trees, rolling rocks, cliffs, terrain traps, rivers, etc.</p> <p>LACES!</p> <p>On small fires with poor communication links - safety check in times should be established with the Fire Centre by using an aircraft to relay information. T</p> <p>4. Resource Request Considerations Determining what resources are required to suppress a fire is 1 of the fundamental tasks of fire assessment.</p> <p>The following points should be considered:</p> <ul style="list-style-type: none"> • Attempt to meet the control objective - keep the fire small and minimize the cost (including damages) by controlling the fire before the next day's burning period has started. The fire assessment you provide is important to the decision making process, but the final decision regarding fire control action rests with the Duty Officer. • Anticipate fire behavior - consider not only what the fire is doing now, but what it may do over the next several hours. Understand that the resources requested may not be available - be flexible and innovative.
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<p>Give an example of when you have asked for more resources than initially needed due to anticipated increases in fire behaviour.</p> <p>Explain the meaning of a complete resource request.</p> <p>Ask the class: why is it important to have an accurate estimate for water delivery equipment?</p> <p>Ask the class: what will the primary task of dozers be during fire suppression?</p> <p>Explain the term control line resistance to the class.</p>	<p>Delays in receiving resources depend on fire location and access as well as resource availability.</p> <ul style="list-style-type: none"> • Make your resource requests complete - consider what equipment will be required to support crews and what crews will be required to support equipment. • Fight the fire aggressively An important rule of firefighting is to action a wildfire aggressively, but a safety first attitude need to be employed. <p>Estimating Resource Requirements Water Delivery Systems - consider the following:</p> <ul style="list-style-type: none"> • Elevation gains (water sources to the top of the fire). • Number of pumps (1 pump - operator probably not required or multiple pumps - 1 or more operators required) • General rule: 3 firefighters per nozzle - 1 nozzle person, 1 hose handler/grubber, 1 grubber. • Difficult terrain and ground cover will require larger crews. <p>Water Tenders/Skidder with Tanks - consider the following:</p> <ul style="list-style-type: none"> • 5 firefighters - 1 pump operator, 1 nozzle with shut off ability, 1 hose handler, 2 firefighters with hand tools. <p>Dozers and Excavators- consider the following:</p> <ul style="list-style-type: none"> • Availability (time to arrive at fire and access). • Machine ability (terrain, rocks, swamps, steep slopes, etc.). • Environmental sensitivity (domestic watershed, riparian zones, streams, aesthetics, etc.) • Number of machines (2 dozers and 1 excavator per flank). • Line locators (1 per flank, 2 in steep terrain and at night). • Burn out and suppression crews (crew size is a function of control line resistance, fuel loading and time of day). <p>Control Line Resistance Steep, rocky or swampy ground will also slow down control line production.</p>
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<p>Explain why a fire assessor needs to consider the rate of spread prior to an air tanker request. The tankers may be used more effectively elsewhere if the fire is burning in unfavorable fuels with extreme intensities.</p>	<p>Are air tankers required? Air tanker support can be extremely useful on initial attack fires. There are no tools that can slow down a fire in as rapid a fashion as air tankers dropping retardant or water on a fire.</p> <p>“It is better to be safe than sorry” is a good policy for air tanker requests.</p> <p>The decision to request air tankers is made after considering the following points:</p> <ul style="list-style-type: none"> • What information was obtained during your daily preparation and safety briefing? • What are the indices - Fuel Moisture Codes and Fire Behavior Indexes? • What is the fire weather forecast? • What is the current fire behavior being experienced in the area? • It is important to have this information available as it will influence your assessment. • If you do not have the indices and weather information, request this information from the Fire Centre. <p>Consider the fire rate of spread.</p> <ul style="list-style-type: none"> • Compare how the situation has changed from the initial reports (provided by lookouts, IA crews or aircraft in the area) to present. • If a fire is spreading quickly, ground crews will need air tanker support to enable them to establish and hold control lines. • Even if fire spread is not rapid, the decision to use air tankers may be made if the fire is threatening to spread into problem fuel types or areas with poor access. <p>Access factors for ground resources.</p> <ul style="list-style-type: none"> • Consider access factors for ground crews and heavy equipment. Air tanker action can support crews already on the fire or it may contain a fire until these crews arrive. Retardant drops rarely extinguish a fire completely and will only slow the rate of spread on moderate to high intensity fires. <p>The temporary advantage gained by a retardant drop will be wasted unless ground crews follow up with aggressive control actions. Always provide for ground crew objectives in your resource requests if air tankers are utilized.</p>
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	<p>Multiple fire starts.</p> <ul style="list-style-type: none"> A number of small fires may be located in the same general area. Air tankers are often an ideal solution in these situations because a drop can be split between 2 fires. Consider all of the factors mentioned above and apply some common sense. If you think you need air tankers then you probably do.
Discuss the example from the manual with the class.	<p>Helicopter Bucketing vs. Air Tanker Drops</p> <p>The decision to use helicopter bucketing is based on several factors.</p> <p>Bucketing can be an effective initial attack option when fires are small and the distance to a water source (bucket turnaround times) is reasonable. An advantage of bucketing is that buckets are usually carried with the helicopter that delivers ground crews to the fire thus the buckets can be used immediately.</p>
Briefly explain your ideas on bucketing guidelines in relation to costs.	<p>Helicopter Bucketing Guidelines: Various criteria (status of fire, previous air tanker action, estimated time/costs, etc.) are established for the use of helicopter bucketing. Firefighters performing fire assessments should be familiar with these guidelines for helicopter bucket use.</p> <p>The Fire Sketch</p> <p>A sketch of the fire is important and should form a part of any fire assessment on larger and more complex fires</p>
Ask the class: why is a fire sketch helpful for the assessor as well as the fire crews on site?	<p>Procedure for Making a Fire Sketch</p> <ul style="list-style-type: none"> Use a piece of plain paper attached to a clipboard. List the items to be recorded on the left side of the paper. Orient North and South directions and look for some obvious topographical landmarks at or near the fire (e.g. creeks, roads, lakes, rock slides, ridges, etc.). Draw a North arrow on the sketch paper. Draw in 2 or more of the topographical features on the sketch showing them in approximate relation to North, South, East or West. Mark the estimated distance between each. Draw the fire perimeter in relation to these topographical features.

<p>Ask the class: why is it important to get feedback from the Duty Officer and Crew Supervisors regarding your fire assessment?</p> <p>Ask the trainees to provide feedback on the following questions: define fire assessment. List 5 items you would have in your fire assessment kit. List 3 considerations for Aircraft Recces. Describe a time when a ground assessment should not be completed. List 2 methods of measuring distance on a fire. How many degrees is 100 % slope? How big is a 100 metre by 100 metre fire? What fire assessment information should be provided to fire crews? What should be considered before requesting air tanker support?</p>	<ul style="list-style-type: none"> • Draw in other significant items around the fire perimeter which pertain to fire control including water sources, natural breaks, fuel types, point of origin, etc. • Do not try to complete all of the features mentioned above in 1 circuit of the fire. It is too fast and too confusing. Circle the fire 2 or 3 times and do the sketching in the sequence described. • Outlining the fire perimeter on a topographical map is also effective. <p>Debriefing Process An important part of fire assessment training is the debriefing process. This can be done during a general fire debrief or After Action Review on smaller incidents.</p> <p>An experienced firefighter will contact the users of your fire assessment (e.g. Duty Officers, AAO, Initial Attack Crew Leaders, Crew Supervisors, etc.) after the fire has been actioned and solicit comments from these individuals as to the quality and accuracy of the assessment.</p> <p>Questions for Assessment of Learning</p>
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INSTRUCTOR'S EQUIPMENT AND SUPPLIES LIST

Classroom Equipment

Minimum Equipment Requirements:

- White board
- White board markers
- Media screen
- BCWS Laptop with IDIR access
- LCD/LED Projector with all required attachments
- Extension cord
- Trainee manuals
- Instructor's manual
- An IFR pad
- Trainee sign-up master list
- Trainee written exams
- Fire assessment activity sheets
- Pen and Pencils (for participants to take notes and complete written exam)
- Name cards

Suggested equipment:

- Flip chart with markers
- 2-way radios (Motorola) for trainees to use in partners for the activity
- Topographic maps of British Columbia and the Fire Zone
- Vegetation resource inventory maps
- Fire assessment notes from personal experience
- Photos of IA fires for review

S-241 Fire Assessment Exam Answer Key

Name: _____ Date: _____

There is a 30 minute time limit for this exam. Mark: _____ / 55 (Pass = 70%)

(2 marks) 1. Give a definition of fire assessment.

- it helps the Duty Officers by painting a clear picture of the fire.
- determines values at risk based on fuels, weather, topography and fire behaviour.
- it is an ongoing process while on a wildfire.

(2 marks) 2. How does an accurate fire assessment assist the RWCO in performing the Duty Officer role effectively for the Fire Centre?

- it provides information in order for the RWCO to prioritize fires.
- it will be used to determine the strategies and tactics employed.
- it will help with allocating resources based on suppression needs.

(3 marks) 3. How is a Fire Assessment different from an Initial Fire Report?

- a fire assessment is ongoing while there is a single IFR.
- the fire assessment will elaborate on many of the IFR sections.
- a fire assessment will provide more details than an IFR.

(1 mark) 4. A fire assessment is completed on **every** reported wildfire regardless of whether the fire is actioned (circle the correct answer).

True **False**

(3 marks) 5. List 3 individuals who will receive a fire assessment?

- RWCO
- ZWCO
- Firefighters/Fire Personnel

_____ / 11

- (3 marks) **6.** Who performs a fire assessment? List the 3 most common fire personnel who take part in this task.
- An IC
 - Air Patrol Officers
 - Experienced Firefighters (IA Crew Leaders)
- (3 marks) **7.** What does the RWCO do with the fire assessment information?
- compiles all of the relevant fire information and puts the fire on a map of the region.
 - deploys necessary resources in order to meet control objectives if a fire is actioned.
 - provides any additional support as required.
- (3 marks) **8.** Please list 3 factors you should consider as part of your daily preparation for fire assessment assignments.
- review the weather and fire behaviour forecasts.
 - know the current fire behaviour in the Zone.
 - know the capabilities and limitations of the available resources.
 - review the CFFDRS and know the fuel types in the Zone.
 - monitor all radio transmissions for the other fires in the Zone.
- (4 marks) **9.** List 4 items that need to be carried in a 'Fire Assessment Kit.'
- maps of the Fire Zone and access routes.
 - pens, pencils and ruler.
 - clipboard with paper.
 - ticker or flagging tape.
 - a handheld GPS unit.
 - an IFR pad (FS 260).
- (1 mark) **10.** After locating a fire, firefighters should not contact the Fire Centre with an initial communication until an **IFR and Fire Assessment** are completed and ready to transmit.

True

False

_____ / 14

- (3 marks) **11.** List 3 important considerations for performing a 'Recce' from an aircraft.
- perform the recce in a planned and orderly manner.
 - ensure the pilot flies the aircraft so the assessor has the best view of the fire.
 - fly high for the first pass and fly low for the second pass.
- (1 mark) **12.** Why is a geographic location reported in addition to the latitude and longitude coordinates on the Initial Fire Report?
- this will provide a cross check of the latitude and longitude coordinates for the fire.
 - the fire may be given a name corresponding to this description.
- (1 mark) **13.** The fire you are assessing requires immediate air tanker action. Recent radio transmissions indicate that all tanker groups are either out of the province or committed to other fires.
- Which of the following is the correct action on your part (circle the correct answer)?
- a) Request a helicopter with bucket instead of the air tankers.
 - b) Request the air tanker action as originally planned.**
 - c) Request an updated weather forecast and re-evaluate your fire assessment.
 - d) Request that your helicopter pilot (a very experienced individual make a final decision on your behalf.
- (1 mark) **14.** A fire assessment is a high priority radio communication and is only surpassed by a distress or urgency transmission.
- True False**
- (2 marks) **15.** Describe a fire situation where a firefighter, performing a fire assessment on the ground, should not walk around a fire to obtain more fire information.
- if fire activity and spread rates are too high to do so safely.
 - if the terrain is too hazardous for the assessor.

- (1 mark) 16. You have been dispatched to assess a fire in the Adams River Drainage. The latitude and longitude are given as: 50°56.249' N and 119°39.694' W. As you fly over Adams River you notice a column of smoke on the ridge ahead.

Which of the following is an appropriate action on your part (circle the correct answer)?

- a) Contact the RWCO immediately and advise that you have the fire in sight.
- b) Have the pilot start a circuit approximately 1000 feet above the fire and determine the fires latitude and longitude coordinates from a GPS.**
- c) Have the pilot start a circuit approximately 1000 feet above the fire and start completing the IFR - there is no time to waste.
- d) Have the pilot fly a low pass over the fire so you can assess the fuel types.

- (1 mark) 17. A crew leader should not waste valuable helicopter time after performing a thorough air reconnaissance then offloading a crew and equipment at a fire by requesting that the helicopter remain close by (within radio range) until a ground recce is completed.

True False

- (2 marks) 18. List and describe 2 different methods that a person performing a fire assessment may use in determining ground distances on fires?

- linear comparison - use a map to determine the distance between 2 points in the area and then compare this to the fire perimeter.
- use tree lengths on smaller fires.
- by flight time - the pilot will fly around the perimeter at a set speed.

- (1 mark) 19. Which of the following refers to '50 % slope' (circle the correct answer)?

- a) 50 metres of vertical rise in 50 metres of horizontal distance.
- b) 50 metres of vertical rise in 100 metres of horizontal distance.**
- c) 100 metres of vertical rise in 50 metres of horizontal distance.
- d) none of the above.

_____ / 5

(1 mark) 20. A 100 % slope has an angle of 45°.

True False

(1 mark) 21. A fire perimeter is measured at 50 metres by 50 metres. How many hectares is this fire?

0.25 ha

(1 mark) 22. Which of the following statements is true (circle the correct answer)?

a) Meridians of longitude run east and west and parallels of latitude run north and south.

b) Parallels of longitude run east and west and meridians of latitude run north and south.

c) Meridians of longitude run north and south and parallels of latitude run east and west.

d) None of the statements above are true.

(1 mark) 23. When describing the characteristics of a fire, what is the difference between 'candling' and 'crowning' (circle the correct answer)?

a) Candling is when a dry danger tree bursts into flames following a lightning strike, and crowning is not due to lightning strikes.

b) Candling occurs when a single tree or small group of trees flares up, and crowning involves the ignition of the aerial fuels in numerous trees in a stand, which continues for an extended period.

c) Candling occurs only in forests with excessive beetle kill whereas crowning occurs in blow down.

d) None of the statements above are true.

(2 marks) 24. Why is a fire's position on the slope important?

- rate or spread and potential fire behaviour is greatest lower on the slope rather than higher - more fuels are available for consumption.

- timber type is smaller and the value is lower when higher on the slope.

(3 mark) **25.** List and describe the 3 Fire Weather Index moisture codes. Do not use abbreviations.

- Fine Fuels Moisture Code - any smaller fuels that dry out quickly at the ground or surface level (forest litter).
- Duff Moisture Code - duff layers that are 5 to 10 cm deep and includes small to medium branches and logs.
- Drought Code - duff layers that are 10 to 20 cm deep and includes larger fuels such as logs and standing dead timber.

(3 marks) **26.** List 3 important procedural steps when transmitting an IFR to the Fire Centre.

- double check the fire number and location before transmitting the IFR to the Fire Centre dispatch.
- request a read back of the information after each colour coded section to ensure the proper information has been taken.
- speak in a slow, clear and concise manner.

(3 marks) **27.** List 3 pieces of information that should be considered when providing a fire assessment to the suppression crews on site.

- safety concerns and fire related hazards.
- an update on the current fire information including weather and fire behaviour.
- a review of the objectives and fire suppression activities taking place as well as the progress being made.

(1 mark) **28.** What is the most important consideration to think of when requesting air tankers?

- anticipated fire spread - ask for air tankers as soon as possible due to the lag time in the request.
- will the air tankers get to the fire on time - dictated by the fire behaviour and fuel types in the area.

(1 mark) **29.** Air tanker drops always need to be followed up with what type of activity in order to be effective?

- constant fire suppression work by ground personnel.

_____ / 11

S-241 Fire Assessment Exam

Name: _____ Date: _____

There is a 30 minute time limit for this exam. Mark: _____ / 55 (Pass = 70%)

(2 marks) 1. Give a definition of fire assessment.

(2 marks) 2. How does an accurate fire assessment assist the RWCO in performing the Duty Officer role effectively for the Fire Centre?

(3 marks) 3. How is a Fire Assessment different from an Initial Fire Report?

(1 mark) 4. A fire assessment is completed on **every** reported wildfire regardless of whether the fire is actioned (circle the correct answer).

True **False**

(3 marks) 5. List 3 individuals who will receive a fire assessment?

_____ / 11

(3 marks) **6.** Who performs a fire assessment? List the 3 most common fire personnel who take part in this task.

(3 marks) **7.** What does the RWCO do with fire assessment information?

(3 marks) **8.** Please list 3 factors you should consider as part of your daily preparation for fire assessment assignments.

(4 marks) **9.** List 4 items that need to be carried in a 'Fire Assessment Kit.'

(1 mark) **10.** After locating a fire, firefighters should not contact the Fire Centre with an initial communication until an **IFR and Fire Assessment** are completed and ready to transmit.

True

False

_____ / 14

(3 marks) **11.** List 3 important considerations for performing a 'Recce' from an aircraft.

(1 mark) **12.** Why is a geographic location reported in addition to the latitude and longitude coordinates on the Initial Fire Report?

(1 mark) **13.** The fire you are assessing requires immediate air tanker action. Recent radio transmissions indicate that all tanker groups are either out of province or committed to other fires.

Which of the following is the correct action on your part (circle the correct answer)?

- a) Request a helicopter with bucket instead of the air tankers.
- b) Request the air tanker action as originally planned.
- c) Request an updated weather forecast and re-evaluate your fire assessment.
- d) Request that your helicopter pilot (a very experienced individual make a final decision on your behalf.

(1 mark) **14.** A fire assessment is a high priority radio communication and is only surpassed by a distress or urgency transmission.

True False

(2 marks) **15.** Describe a fire situation where a firefighter, performing a fire assessment on the ground, should not walk around a fire to obtain more fire information.

- (1 mark) **16.** You have been dispatched to assess a fire in the Adams River Drainage. The latitude and longitude are given as: 50°56.249' N and 119°39.694' W. As you fly over Adams River you notice a column of smoke on the ridge ahead.

Which of the following is an appropriate action on your part (circle the correct answer)?

- a)** Contact the RWCO immediately and advise that you have the fire in sight.
- b)** Have the pilot start a circuit approximately 1000 feet above the fire and determine the fire's latitude and longitude coordinates from a GPS.
- c)** Have the pilot start a circuit approximately 1000 feet above the fire and start completing the IFR - there is no time to waste.
- d)** Have the pilot fly a low pass over the fire so you can assess the fuel types.

- (1 mark) **17.** A crew leader should not waste valuable helicopter time after performing a thorough air reconnaissance and offloading a crew and equipment at a fire by requesting that the helicopter remain close by (within radio range) until a ground recce is completed.

True False

- (2 marks) **18.** List and describe 2 different methods that a person performing a fire assessment may use in determining ground distances on fires?

- (1 mark) **19.** Which of the following refers to '50 % slope' (circle the correct answer)?

- a)** 50 metres of vertical rise in 50 metres of horizontal distance.
- b)** 50 metres of vertical rise in 100 metres of horizontal distance.
- c)** 100 metres of vertical rise in 50 metres of horizontal distance.
- d)** none of the above.

_____ / 5

(1 mark) 20. A 100 % slope has an angle of 45°.

True False

(1 mark) 21. A fire perimeter is measured at 50 metres by 50 metres. How many hectares is this fire?

_____ ha

(1 mark) 22. Which of the following statements is true (circle the correct answer)?

- a) Meridians of longitude run east and west and parallels of latitude run north and south.
- b) Parallels of longitude run east and west and meridians of latitude run north and south.
- c) Meridians of longitude run north and south and parallels of latitude run east and west.
- d) None of the statements above are true.

(1 mark) 23. When describing the characteristics of a fire, what is the difference between 'candling' and 'crowning' (circle the correct answer)?

- a) Candling is when a dry dangerous tree bursts into flames following a lightning strike, and crowning is not due to lightning strikes.
- b) Candling occurs when a single tree or small group of trees flares up, and crowning involves the ignition of the aerial fuels in numerous trees in a stand, which continues for an extended period.
- c) Candling occurs only in forests with excessive beetle kill whereas crowning occurs in blow down.
- d) None of the statements above are true.

(2 marks) 24. Why is a fire's position on the slope important?

_____ / 6

(3 mark) **25.** List and describe the 3 Fire Weather Index moisture codes. Do not use abbreviations.

(3 marks) **26.** List 3 important procedural steps when transmitting an IFR to the Fire Centre.

(3 marks) **27.** List 3 pieces of information that should be considered when providing a fire assessment to the suppression crews on site.

(1 mark) **28.** What is the most important consideration to think of prior to requesting air tankers?

(1 mark) **29.** Air tanker drops always need to be followed up with what type of activity in order to be effective?

_____ / 11

S-241 Fire Assessment Activity

Name: _____

Date: _____

There is a 25 minute time limit.

Mark: / 30 (Pass = 70%)

Purpose: To improve basic fire assessment skills while enhancing each trainee's ability to communicate critical fire information.

Process: Follow the instructions written on the Power Point Slides. Complete an IFR using the first 4 fire photos provided. Draw a rough sketch of the fire on the second page of the assignment. Write out an updated fire assessment for the Fire Centre after viewing the final 2 photos.

- 1. Fire Notes** - write out all relevant information about the fire from the photos. This information will be used to complete an IFR. Create a fire number based on the Incident Number slide from manual and slides.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

2. Fire Sketch

3. Final Fire Assessment

[illegible]

7. FIRE ASSESSMENT ACTIVITY

Teaching Aids/Cues	Outline of Significant Course Content
<p>Use Power Point presentation with appropriate slides.</p> <p>Explain the activity to the trainees.</p> <p>Have a trainee repeat the process out loud to ensure understanding.</p> <p>Describe how the trainees will be evaluated on this assignment.</p> <p>Give the trainees 1 minute to review each forecast and fuel type slide.</p> <p><u>Give the trainees 2 minutes to review each fire photo. Only view the first 4 photos for the IFR.</u></p> <p>Give the trainees 2 minutes to observe the final 2 photos of the fire.</p> <p>Demonstrate how to communicate the Red Section of an IFR with another instructor or a volunteer trainee.</p> <p>Have the trainees create names and locations along with an incident number.</p> <p>Ask the class: are there any questions about fire assessment?</p>	<p>Purpose - read out loud.</p> <p>Process - read out loud.</p> <p>Power Point Instructions 1</p> <ol style="list-style-type: none"> 1) Study the following fire information. 2) Examine the fire assessment checklist from the trainee manual. 3) Note all relevant fire information observed in the photos. 4) Complete an IFR provided by the instructor or the sample form from the manual. 5) Complete a sketch of the fire based on the photos. <p>Activity Grading Criteria</p> <ul style="list-style-type: none"> ✓ Visual assessment of fire information - notes written out for the IFR. ✓ Communicating the IFR to a partner - will be copied to a blank report. ✓ The sketch of the fire - important points (i.e. water sources, values). ✓ Updated Fire Assessment Notes - any changes that occurred. <p>Power Point Instructions 2 - IFR and Fire Assessment Exercise</p> <ol style="list-style-type: none"> 1) Select another trainee as your partner. 2) The class will be divided into 2 groups. 3) 1st Communication - provide the Fire Centre (your partner) with a complete IFR including actions recommended (use radio if available). 4) Individually complete a full fire assessment - use forecasts from slides. 5) View the final photo of the fire. 6) 2nd Communication - update the Fire Centre with a complete Fire Assessment and discuss concerns with the RWCO (hand in final assessment).

LEARNING OBJECTIVES CONTENTS

Section 1 - Course Overview

Upon completion of this course, the trainee will establish a basic knowledge of:

- √ the British Columbia Wildfire Service organizational structure, the common wildfire environment, suppression tactics used, equipment/resources deployed to fires, and procedures used in the Province to **SAFELY** and effectively respond as a basic wildland firefighter.

Section 2 - Wildfire Detection and Reporting

Upon completion of this section, the trainee will develop a basic understanding of detection and reporting by learning the following:

- √ The 10:00 A.M. Concept;
- √ The Key Elements of assessing and reporting wildfires in British Columbia;
- √ The role of industry and the public in fire suppression.

Section 3 - Forest Fuels and Fire Behaviour

Upon completion of this section, the trainee will have a basic understanding of the following aspects of wildland fire behavior:

- √ The basic arrangement of forests and fuels in the wildland fire environment;
- √ The 3 elements of the fire triangle;
- √ The 3 key factors that influence fire behavior: the 30/30 Crossover concept;

- ✓ The main components of the Canadian Forest Fire Danger Rating System;
- ✓ The 3 fire types as well as candling and spotting;
- ✓ The Fire Intensity Ranking System;
- ✓ The parts of a wildfire.

Section 4 - Wildfire Organizational Structure

Upon completion of this section, the trainee will develop a basic understanding of wildfire organization by learning the following:

- ✓ The 5 major organizational activities within the Incident Command System, and explain the primary functions of each.
- ✓ The Crew Leaders primary function within the incident organization.
- ✓ Chain of Command principles.
- ✓ How span of control applies to the Incident Command System and this concept is used with wildfire resources.
- ✓ The 6 major incident facilities included in the ICS, and the functions of all 6.

Section 5 - Fireline Safety

Upon completion of this section, the trainee will develop a basic understanding of fireline safety by learning the following:

- ✓ When you should receive a briefing and what should it involve;
- ✓ The LACES safe work practice for wildfires;
- ✓ Fireline tactical withdrawal or evacuation procedures;
- ✓ Personal Protective Equipment used on the fireline;
- ✓ The 5 basic fireline hazards;
- ✓ Fire entrapment, fire entrapment avoidance and fire entrapment survival;
- ✓ Wildland/Urban Interface hazards;
- ✓ The Danger Tree Assessment system, no work zones and significant danger tree hazards;
- ✓ Firefighter fitness and health.

Section 6 - Wildland-Urban Interface Fire Safety

Upon completion of this section, the trainee will develop a basic understanding of the safety concerns involved in interface fires by learning the following:

- ✓ What a wildland-urban interface fire is;
- ✓ Structural triage priorities and factors;
- ✓ The 6 main hazards to firefighter safety specific to interface fires;
- ✓ Basic sprinkler set up and structure preparation.

Section 7 - Emergency Fireline Communications

Upon completion of this section, the trainee will develop a basic understanding of emergency fireline communications by discussing:

- √ The BCWS radio frequencies used on wildfires;
- √ Basic emergency operation of a two-way handheld radio;
- √ Emergency 'MAYDAY' transmission protocols.

Section 8 - Fire Suppression

Upon completion of this section, the trainee will develop a basic understanding of wildfire suppression by learning the following:

- √ The basic fire suppression principles;
- √ When you should receive a briefing and what it should involve;
- √ The principles of control line construction;
- √ The 3 attack methods;
- √ The principles of mop-up, cold trailing with inspection and patrol.

Section 9 - Water Delivery Systems

Upon completion of this section, the trainee will demonstrate a basic understanding of the water delivery systems used in wildfire suppression by practicing with pumps in the field and learning the following:

- √ The principles of suction, water pressure, back pressure and friction;
- √ The 3 sizes and 3 types of BC Wildfire Service hose;
- √ The Standard Hose Lay;
- √ Trouble-shooting and basic maintenance of the Mark III pump;
- √ The 2 common multi-pump systems;
- √ The 3 uses of sprinklers in wildfire suppression;
- √ The properties of Class 'A' foam that make it an effective fire extinguishing agent.

Section 10 - Burn Operations

Upon completion of this section, the trainee will develop a basic understanding of ignition operations by learning the following:

- √ The 3 types of burn operations and the attack methods they are used with;
- √ The common types of ignition devices used by fire personnel;
- √ The general crew configuration for burn operations;
- √ Safe work practices used during burn operations.

Section 11 - Hand Tools

Upon completion of this section, the trainee will develop a basic understanding and knowledge of:

- √ The hand tools used by wildland firefighters;
- √ The fireline safety rules associated with the use of hand tools in British Columbia.

Section 12 - Heavy Equipment

Upon completion of this section, the trainee will develop a basic understanding of fireline heavy equipment by learning the following:

- √ The common pieces of heavy equipment used on the fireline;
- √ The safety hazards associated with working around heavy equipment;
- √ Safe work practices used when working with heavy equipment.

Section 13 - Helicopter Safety and Use

Upon completion of this section, the trainee will develop a basic understanding of safe work practices used when working around helicopters on the fireline by learning the following:

- √ The 3 main danger areas of a helicopter;
- √ The procedure for approaching and departing a helicopter;
- √ When a helicopter safety briefing should be delivered;
- √ Helicopter bucketing and long-lining safety.

Section 14 - Fixed Wing Fireline Aircraft

Upon completion of this section, the trainee will develop a basic understanding and knowledge of safe work practices used when working around fixed wing air tankers on the fireline.

Section 15 - WHMIS and TDG

Upon completion of this section, the trainee will develop a basic understanding and recognition that additional training is required for the following safety protocols:

- √ WHMIS, to identify and safely work with hazardous materials in the workplace;
- √ TDG, to safely handle and transport dangerous goods in compliance with Transportation of Dangerous Goods regulations.