

Response Levels and Wildland Fire Decision Support System Content Outline

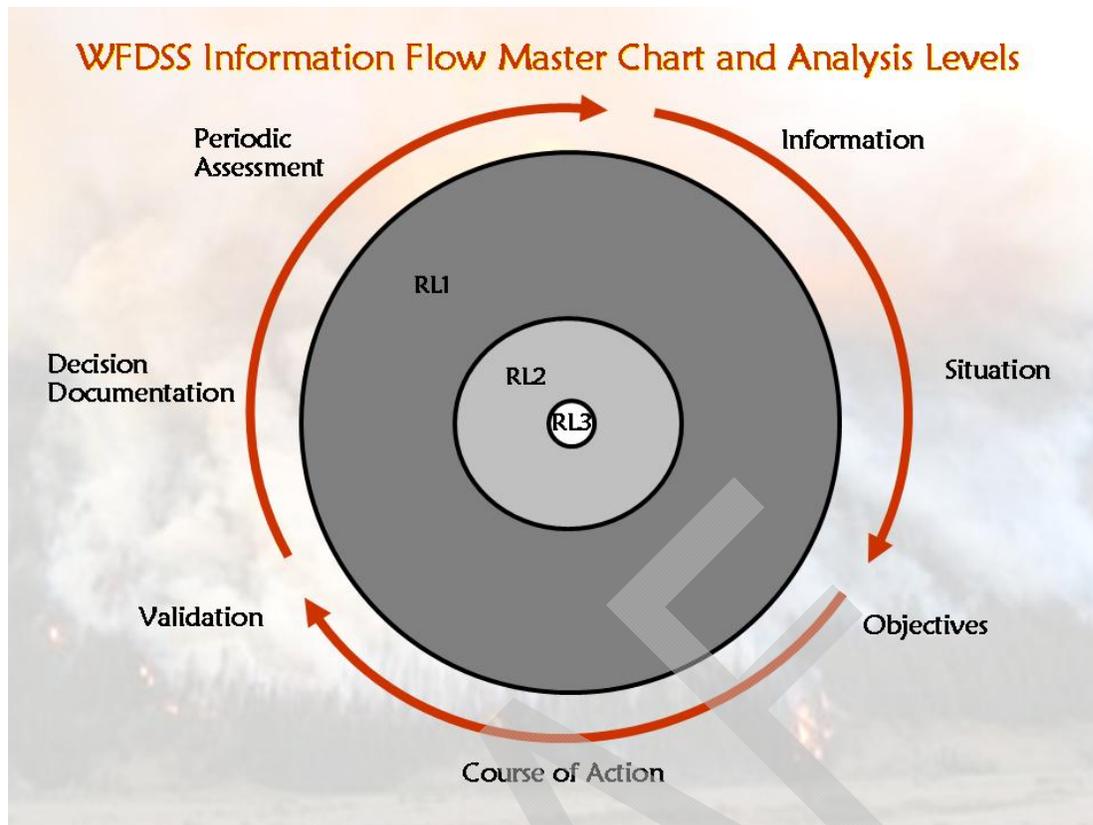
In wildland fire management, practitioners are accustomed to levels of incident management, initial attack response, dispatch levels, and preparedness levels. The term "Response Level", as used in the Wildland Fire Decision Support System (WFSS), does not relate to the amount of overwhelming force needed to control or contain the fire, but serves as a guide for the level of analysis and planning in response to overall fire complexity.

Response Levels are different than the usual "forged in steel and etched in stone" rules that wildfire managers are habituated to following. Response levels provide the following:

- Are in line with doctrine.
- Do not direct decision makers to a specific response; rather, the response is part of the decisions that are made.
- Help guide the decision process and represent the consolidated quantitative and qualitative decision making support for a given situation.
- Allow the wildfire managers and decision makers to use the best available science to quantitatively and qualitatively inform and support wildfire decisions.
- Frame the system to be consistent with the problem.

As the fire situation escalates in complexity, decision makers progress through the Response Levels as guides to the appropriate level of analysis and planning to meet the problem. Response Levels help managers

- address the right questions
- use the proper level of scientific analysis and inquiry
- direct the analysis to most decision-relevant questions for different and changing situations.



The image above shows the flow of the analysis and planning process within WFDSS. The color variations in the response level rings are like a dimmer switch. In Response Level 1 (RL1) we are following pre-planned actions as stated in our Fire Management plans (FMP) or Annual Operating Plans (AOP). Basic situational assessment is required.

In Response Level 2 (RL2), we need to turn up the lights on our decision. The fire complexity is changing, likely increasing, and management responses need to change correspondingly. In every case, a decision over and above the preplanned response will be necessary. Resource benefit objectives may be involved solely or in combination with protection objectives, and potential incident durations may range from short to long-term situations. Additional situation assessment (including but not limited to maps, values inventory, weather forecasts, verification of strategic objectives), as well as incident objective and course of action development, and fire behavior assessment are necessary to effectively analyze and plan a response for the incident under increasing complexity.

In Response Level 3 (RL3), we need to turn the bright lights on our decision. The incident is moving into the highest complexity levels and has numerous potential consequences, such as increased firefighter exposure, longer durations, larger potential fire sizes, increasing threats to values, and greater commitments of firefighting resources. The most detailed level of analysis and planning is needed. We need the most situation assessment, advanced fire behavior modeling, incident objective and course of action development, fire fighting resource availability evaluation, and values

assessment. In RL3 there is also a strong need to document the social and political influences and concerns.

The following table summarizes the inputs of WFDSS needed at each RL. As mentioned earlier, many inputs are recommended but not required.

	RESPONSE LEVEL 1	RESPONSE LEVEL 2	RESPONSE LEVEL 3
Suggested Incident Complexity	Initial Attack or Initial decision to manage fire partially or only for resource benefit covered in pre-planned response from annual operating plan or fire management plan (A course of action may be needed to manage an unplanned ignition for the single objective of resource benefit or multiple objectives which include resource benefit especially if incident spans more than one burn period and course of action is not covered in the pre-planned response = move to RL2)	Extended Attack; Short term durations; Resource benefit objectives; Short to long-term durations; All types of incident management organizations	Mid to long-term duration; All types of incident management organizations

<p>Documentation Required</p>	<p>Minimal Documentation if following pre-planned response from Fire Management Plans</p> <p>Decision document (DAR-Decision Analysis Report) required for Resource Benefit Fires</p>	<p>More Documentation</p> <p>Things to Consider:</p> <ul style="list-style-type: none"> • Fire Behavior Models • Values Inventory • Relative Risk / Response Level Charts • Resource availability to Complete Course of Action • Cost & how cost was developed 	<p>Most Documentation</p> <p>Things to Consider:</p> <ul style="list-style-type: none"> • Long term fire • Expense • Need to evaluate fire environment, values and the landscape • More modeling • More detailed rationale documentation • Are the resources available to achieve the decision objectives? <p>Things to Include:</p> <ul style="list-style-type: none"> • Fire Behavior Models • Values at Risk • Relative Risk / Response Level Charts • Resources availability to Complete Course of Action • Cost & how cost was developed
<p>Agency Administrator Signature Required</p>	<p>It Depends –</p> <p>Is the pre-planned response followed? If so, No signature required</p> <p>Is there a decision made to suppress a fire or monitor for resource benefit?</p> <p>If so, Yes signature required</p>	<p>YES</p>	<p>YES</p>

<p>INFORMATION Mandatory Inputs</p>	<ul style="list-style-type: none"> -Incident Name -Coordinates -Geographic Area -Affected Jurisdictions -Fire Number -Incident Start Date and Time -Incident Size -Incident Cause -Landscape Source 	<p>See Response Level 1</p> <p>Update inputs as necessary – Incident Size</p>	<p>See Response Level 1</p> <p>Update inputs as necessary – Incident Size</p>
<p>SITUATION Assessment Available within WFDSS</p>	<ul style="list-style-type: none"> -Location map -Fire Wx Forecast -Fire Danger ERC-G -Fuels Information -Values Inventory -Strategic Objectives/ Management Requirements Entered by the Data Manager -Basic (BFB) and Short-Term Fire Behavior (STFB) 	<p>Can be included in the Decision Document</p> <ul style="list-style-type: none"> -Location map -Fire Wx Forecast -Fire Danger ERC-G -Fuels Information -Values Inventory -Strategic Objectives/ Management Requirements Entered by the Data Manager -Basic (BFB) and Short-Term Fire Behavior (STFB) - FSPPro 	<p>Should be included in the Decision Document</p> <ul style="list-style-type: none"> -Location map -Fire Wx Forecast -Fire Danger ERC-G -Fuels Information -Values Inventory -Strategic Objectives/ Management Requirements Entered by the Data Manager -Basic (BFB) and Short-Term Fire Behavior (STFB) - FSPPro
<p>SITUATION Assessment Tools Outside of WFDSS</p>	<ul style="list-style-type: none"> -Relative Risk Chart -Response Level chart 	<ul style="list-style-type: none"> -Relative Risk Chart -Response Level chart -Constructed Cost -FARSITE -FlamMap 	<ul style="list-style-type: none"> -Relative Risk Chart -Response Level chart -Constructed Cost -FARSITE -FlamMap
<p>OBJECTIVES</p>	<ul style="list-style-type: none"> -Following Pre-Planned Response from FMP / AOP 	<ul style="list-style-type: none"> -Strategic Objectives and Management Requirements pre-loaded by Fire Management Unit -Develop Incident Objectives and Requirements tiered from Strategic Objectives and Management Requirements 	<ul style="list-style-type: none"> -Strategic Objectives and Management Requirements pre-loaded by Fire Management Unit -Develop Incident Objectives and Requirements tiered from Strategic Objectives and Management Requirements

<p>COURSE OF ACTION</p>	<p>-Following Pre-Planned Response from FMP / AOP</p>	<p>-Develop Strategic Direction for the Course of Action (COA) tiered from the Incident Objectives and Requirements</p> <p>-Can Consider Management Action Points (MAPs) if appropriate-see MAPs below</p>	<p>-Develop Strategic Direction for the Course of Action (COA) tiered from the Incident Objectives and Requirements</p> <p>-Consider Management Action Points (MAPs)-see MAPs below</p>
<p>VALIDATION</p>	<p>-Is your pre-planned response successful? Yes or No</p> <p>-If yes, you are done</p> <p>-If no, you need to move to RL2 and need to develop a course of action and complete a decision document</p>	<p>-Submenu tab – Summary of your quantitative support of your COA</p> <p>In the Decision Doc Include:</p> <p>-Quantitative support of your decision</p> <ul style="list-style-type: none"> • Constructed cost • Relative Risk Chart • Response Level Chart • Fire Behavior Models • Resource Availability to support COA 	<p>-Submenu tab – Summary of your quantitative support of your COA</p> <p>In the Decision Doc Include:</p> <p>-Quantitative support of your decision</p> <ul style="list-style-type: none"> • Constructed cost • Relative Risk Chart • Response Level Chart • Fire Behavior Models • Resource Availability to support COA

DECISION	<p>-Did you have to decide on whether to fully suppress a fire or manage it for resource benefit?</p> <p>-If no, you are done</p> <p>-If yes, you need to document your COA and decision.</p>	<p>The Decision is required of the Agency Administrator (AA). The AA needs to approve the decision here to publish the decision document.</p> <p>Decision Content</p> <p>-Assessment – Auto populates with Incident information and planning area fire weather forecast</p> <p>-Objectives – automatically pulls in all included strategic Objectives, Management Requirements, Incident Objectives and Incident requirements</p> <p>-Course of Action – automatically pulls in all included Strategic Direction</p> <p>-Validation- Users Include</p> <p>-Quantitative support of your decision</p> <ul style="list-style-type: none"> • Constructed cost • Relative Risk Chart • Response Level Chart • Fire Behavior Models • Resource Availability to support COA <p>-Rationale – Qualitative discussion to support decision.</p> <p>Things to consider:</p> <ul style="list-style-type: none"> • Social Issues • Political Issues • Resource Issues • Intangible values & issues 	<p>The Decision is required of the Agency Administrator (AA). The AA needs to approve the decision here to publish the decision document.</p> <p>Decision Content</p> <p>-Assessment – Auto populates with Incident information and planning area fire weather forecast</p> <p>-Objectives – automatically pulls in all included strategic Objectives, Management Requirements, Incident Objectives and Incident requirements</p> <p>-Course of Action – automatically pulls in all included Strategic Direction</p> <p>-Validation- Users Include</p> <p>-Quantitative support of your decision</p> <ul style="list-style-type: none"> • Constructed cost • Relative Risk Chart • Response Level Chart • Fire Behavior Models • Resource Availability to support COA <p>-Rationale – Qualitative discussion to support decision.</p> <p>Things to consider:</p> <ul style="list-style-type: none"> • Social Issues • Political Issues • Resource Issues <p>Intangible values & issues</p>
----------	---	---	---

<p>PERIODIC ASSESSMENT</p>	<p>Follow agency guidance on the number of days between assessments for Resource Benefit Fires. No need on IA Fires were there is full suppression.</p>	<p>-Approver fills out assessment -Comments for “Current Decision Valid” are not required, however are a good way to keep track of upcoming issues that may require a new decision (i.e., weather event , ERCs, cost, fire size) -Comments are required for “New Decision Required” -Periodic Assessment is required until an incident is declared out.</p>	<p>-Approver fills out assessment -Comments for “Current Decision Valid” are not required, however are a good way to keep track of upcoming issues that may require a new decision (i.e., weather event , ERCs, cost, fire size) -Comments are required for “New Decision Required” -Periodic Assessment is required until an incident is declared out.</p>
<p>REPORTS</p>	<p>View as needed</p>	<p>View as needed</p>	<p>View as needed</p>

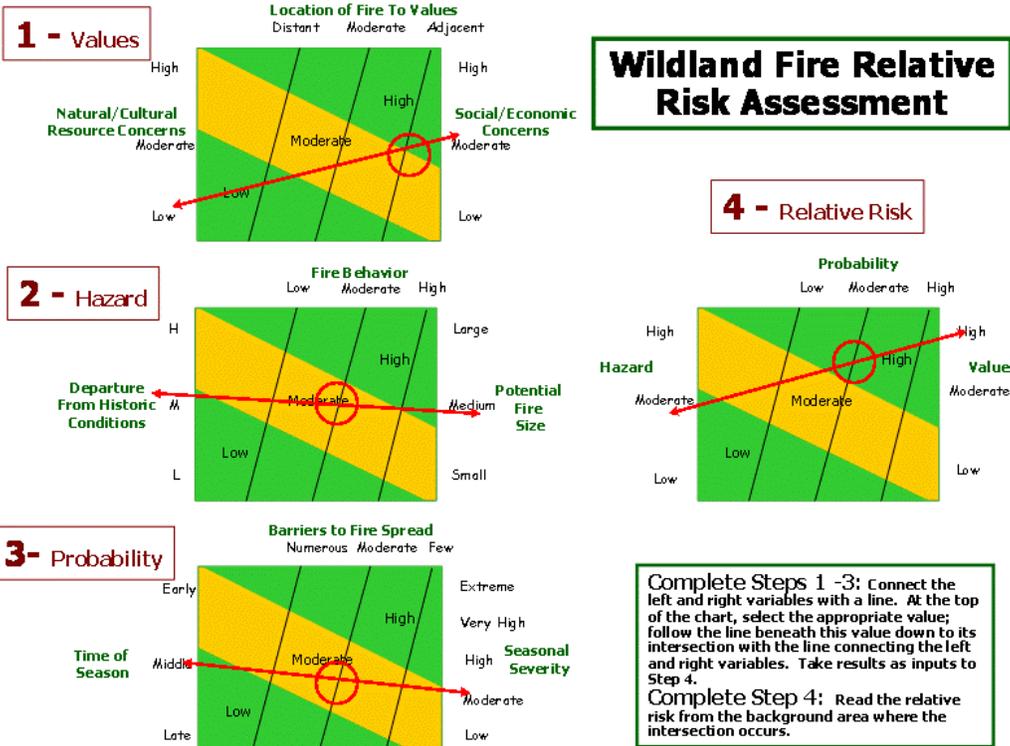
MAPs – Management Action Points

Things to consider and document with MAPs:

- **Management Action Points (MAP) Designator and Description:** Enter unique identifier for management action plan and description such as “MAP 1, North Oak Creek”.
- **Recommended Actions:** Describe the actions to be taken for the MAP.
- **Recommended Resources:** Describe the resources needed to carry out the recommended actions.
- **Estimated Time to Complete:** Enter the expected time needed to complete the recommended actions.
- **Estimated Costs:** Enter the estimated cost of the recommended actions.

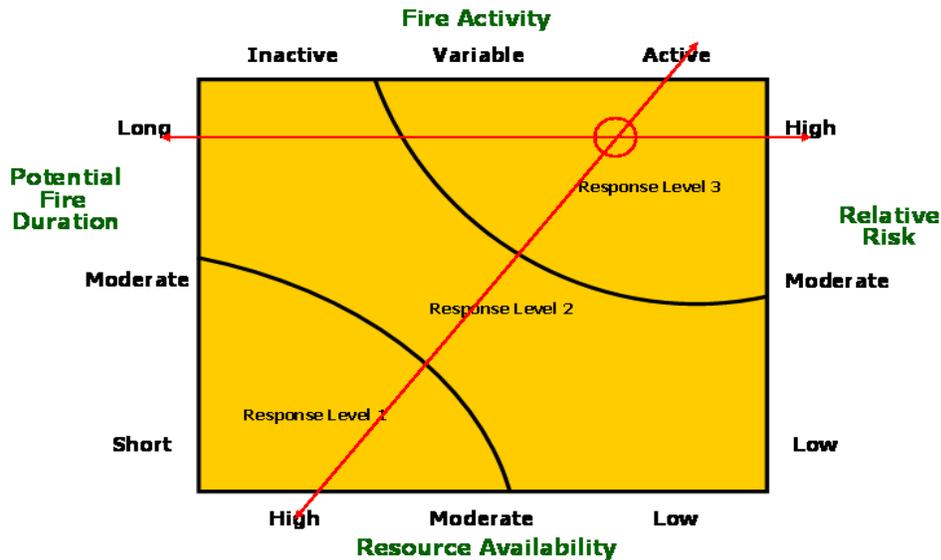
Relative Risk and Response Level Charts to Inform Your Decision Process

The Relative Risk chart and Response Level chart can help users decided which response level and documentation they should consider.



Users move the lines around on the Relative Risk Assessment chart. The information from step 4 is used to populate the Response Level Chart. The Response Level Chart is then utilized to let users know what they should consider for documentation.

Response Level Progression Chart



As the Response Level escalates, more decision support and documentation is recommended. Fire Managers now have the opportunity to utilize the best available science in their decision process.

Wildland Fire Relative Risk Chart

Many Units are managing wildfire with Resource Benefits as identified in Land Use Plans. These units are developing unit specific risk assessment criteria prior to fire season. Identification of these risk assessment criteria promote dialog within the unit and among cooperators prior to the season's first fire. Additionally, incident objectives developed on wildfire with both protection and resource benefits present an opportunity to utilize consistent, solid risk assessment to inform decision making that has been well thought out in advance.

Risk Assessment Criteria

The following criteria are some suggestions.

Values

The values risk assessment component brings in pre-identified Values in terms of three components: Natural/Cultural Concerns (are your concerns low/moderate/high?); Location of fire to values (are values at risk or enhanced from fire; is the fire distant,

moderate or adjacent); Social/Economic Concerns (are your concerns high, moderate or low)?

Here are some questions a unit could answer and use for pre-determined criteria to complete the Values portion of the risk assessment:

- What are the top three Natural/Cultural Concerns that have a direct effect on wildfire decision making?
- How will you measure your concerns: by number, frequency, density, type, and what constitutes a low, moderate, or high level of concern?
- What is considered distant, moderate or adjacent in terms of distance to your fires and values (a possible approach here is to determine by grass/shrub/timber spread rates)?
- Do you have your values available spatially and in a layer with cooperators?
- How will you determine the Social/Economic concerns for your area and how will you rate them into high moderate and low and how will you coordinate with your partners?

Hazard

How will a unit determine what fire behavior is considered high, moderate and low? For example, does low = surface fire, moderate = short duration crown and high = sustained crown fire, and how would this change for your other vegetation types?

Departure from Historic data can be determined in different ways, how will a unit determine high, moderate and low? For example, in frequent fire regimes, number of missed fire return intervals could be used, infrequent fire regimes one might look at vegetation condition.

Potential fire size is very specific to a unit's specific fire program and vegetation, and can vary over time as comfort levels increase (what was once viewed as large fire may now seem small); fire size is strongly correlated to fuel type. An example might be in timber a large fire is greater than 10,000 acres, medium in 5,000 to 10,000 and small is anything less than 5,000 acres.

Probability

What are considered barriers to fire spread for your unit? Are prescribed fires barriers for one year or ten years? Are past wildfires good barriers, and if so for how long; do you have them mapped? Are there other recognized mapped features that you can pre-identify as barriers to fire spread? Are past prescribed fires or wildfires good barriers every year, even the severe fire weather years?

How does your unit determine time of season? Do you have a contiguous fire season, or is it split and, if so, how will you determine that? What are the dates for your unit for early, mid, or late season?

What fire danger index do you use to determine fire severity? Using this index, when do your large fires occur? What are the break points for large fire potential? What break points do you need to establish to define extreme to low fire severity?

Conclusion

Developing risk assessment components related to Hazard and Probability can be identified prior to fire season and captured in annual operating plans or fire management plans and can save valuable time during fire season and ensure a consistent approach.

Below are some things to consider when making inputs for the Relative Risk Chart. The unit's assumptions can be documented along with the chart in the validation portion of the decision document.

PART 1: VALUE ASSESSMENT: Values are those ecologic, social, and economic effects that could be lost or damaged because of a fire. Ecologic values consist of vegetation, wildlife species and their habitat, air and water quality, soil productivity, and other ecologic functions. Social effects can include life, cultural and historical resources, natural resources, artifacts, and sacred sites. Economic values make up things like property and infrastructure, economically valuable natural and cultural resources, recreation, and tourism opportunities. This assessment area allows opportunity for the local Agency Administrator to identify particular local concerns. These concerns may be identified in the fire management plan or other planning documents.

Natural/Cultural Resource Concerns - key resources potentially affected by the fire. Examples include, but are not limited to habitat or populations of threatened, endangered, or sensitive species, water quality, erosion concerns, and invasive species.

Social/Economic Concerns - the risk of the fire, or effects of the fire, impacting the social or economic concerns of an individual, business, community or other stakeholder involved with or affected by the fire. Social concerns may include degree of support for the wildland fire use program or resulting fire effects, potential consequences to other fire management jurisdictions, impacts to tribal subsistence or gathering of natural resources, air quality regulatory requirements and public tolerance of smoke. Economic concerns may include potential financial impacts to property, business, or infrastructure. Infrastructure impacts may be costs to repair or replace sediment catchments, wildlife guzzlers, corrals, roads, culverts, power lines, domestic water supply intakes, and similar items.

PART 2: HAZARD ASSESSMENT: The hazard in wildland fire is made up of the conditions under which it occurs and exists, its ability to spread and circulate, the intensity and severity it may present, and its spatial extent.

Current Fire Behavior - the current fire behavior or that most recently observed. Changing fire behavior is addressed through repeated completion of the Periodic Fire Assessment.

Departure from Historic Conditions - a measure of ecological functions at risk based on changes in vegetation.

Potential fire size - the potential fire size by the end of the season in comparison to historical fire occurrence.

PART 3: PROBABILITY ASSESSMENT: Probability refers to the likelihood of a fire becoming an active event having potential to adversely affect values.

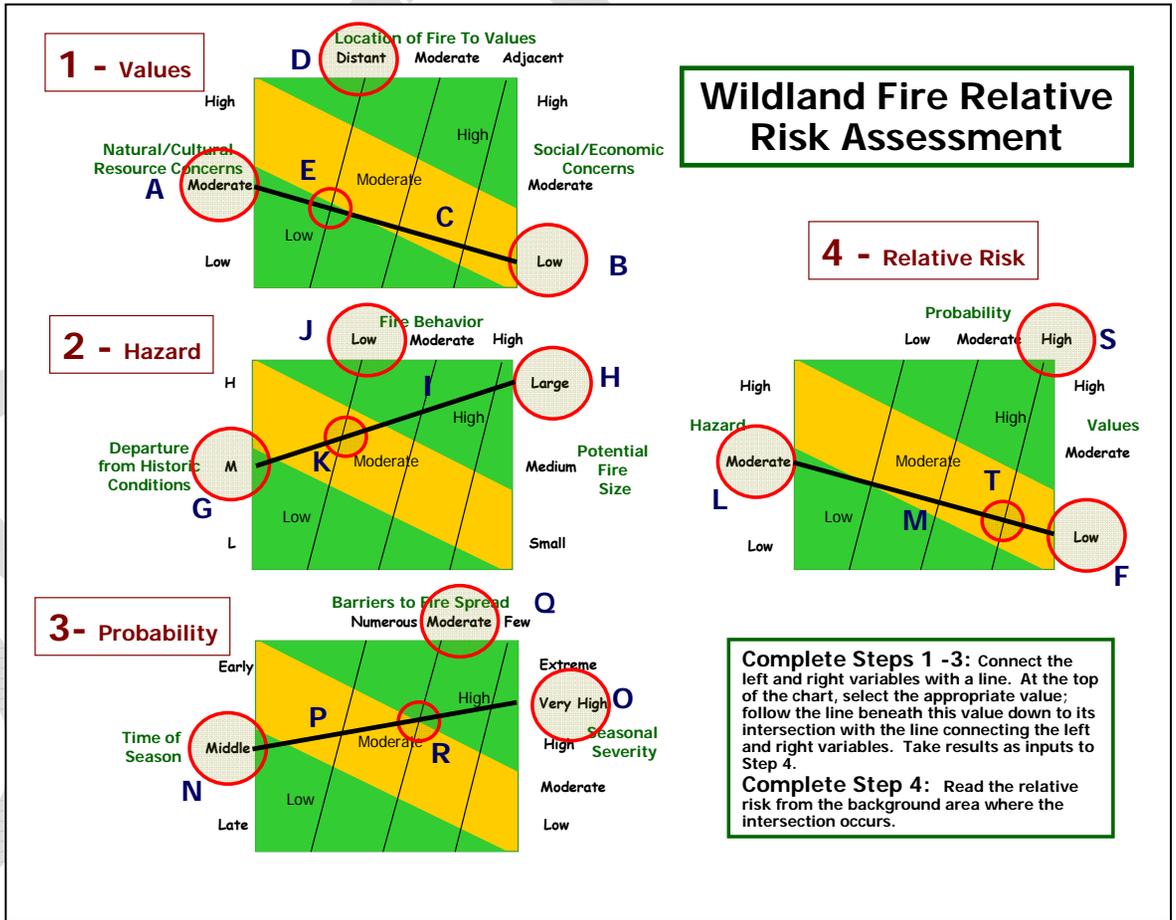
Time of Season - the current time in relation to the historical fire season. During the early part of the fire season, the peak of burning activity is still to come, thus the fire could present substantial variation in behavior and activity. In the middle of the season, the peak of burning activity may or may not have occurred while in the late part of the season, the peak of fire activity generally has occurred and managers can reasonably expect diminishing fire activity and behavior as time progresses. As the amount of fire season remaining decreases or as the time of season progresses from early to late, management concerns and issues associated with potential fire activity decrease.

Seasonal Severity - a measure of the potential burning conditions as expressed by factors such as energy release component (ERC), drought status, live fuel moistures, dead fuels moistures, soil moisture, stream discharge, and similar types of measures.

Barriers to Fire Spread - a measure of the natural defensibility of the fire location and an indication of degree of potential mitigation actions needed.

Step-By-Step Instructions for Completing the Wildland Fire Relative Risk Assessment

A	Step 1	Locate Natural/Cultural Resource Concern level
B	Step 1	Locate Social/Economic Concern level
C	Step 1	Draw line connecting left and right variables
D	Step 1	Locate Location of Fire to Values level
E	Step 1	Follow interior line down to intersection with line connecting left and right variables, locate Value Assessment output (Low, Moderate, High)
F	Step 4	Take Step 1 - Value Assessment output to Step 4 as Value input
G	Step 2	Locate Fire regime condition class level
H	Step 2	Locate Potential Fire Size level
I	Step 2	Draw line connecting left and right variables
J	Step 2	Locate Fire Behavior level
K	Step 2	Follow interior line down to intersection with line connecting left and right variables, locate Hazard Assessment output (Low, Moderate, High)
L	Step 4	Take Step 2 - Hazard assessment output to Step 4 as Hazard input
M	Step 4	Draw line connecting Value and Hazard levels
N	Step 3	Locate Time of Season level
O	Step 3	Locate Seasonal Severity level
P	Step 3	Draw line connecting left and right variables
Q	Step 3	Locate Barriers to Fire Spread level
R	Step 3	Follow interior line down to intersection with line connecting left and right variables, locate Probability Assessment output (Low, Moderate, High)
S	Step 4	Take Step 3 - Probability assessment output to Step 4 as Probability input



Wildland Fire Response Level Progression Chart

The Response Level Progression chart can be used to inform decision makers about the level documentation their incident may require. There are four inputs to the chart: Relative Risk, Fire Activity, Potential Fire Duration, and Resource Availability.

After completing the Relative Risk chart, the relative risk calculated in BOX 4 can be transferred to the Response Level chart. The Relative Risk is informed by assessing Values, Hazards and Probability in the Relative Risk Chart.

Next, complete the three elements that complete the Response Level Chart:

Fire Activity - The current fire activity or that was most recently observed. The questions to ask are: What is the growth potential? How much of the fire perimeter is active?

Potential Fire Duration - The estimated length of time that the fire is expected to remain active and growing. This is based on the time of season, expected weather and historic fire season. The questions to ask are: What is the predicted weather for more than just tomorrow? Where are we at in the season?

Resource Availability - Availability of fire fighting resources to accomplish the proposed Courses of Action in the Decision Document. The questions to ask are: How active is the geographic area? How active is the nation? Can we obtain the resources to accomplish our course of action that was developed?



Step-By-Step Instructions for Completing the Wildland Fire Relative Risk Assessment

A	Step 1	Transfer Relative Risk Chart information.
B	Step 2	Locate Potential Fire Duration level
C	Step 3	Draw line connecting left and right variables
D	Step 4	Locate Location of Fire Activity level
E	Step 5	Locate Resource Availability level
F	Step 6	Draw line connecting top and bottom variables
G	Step 7	Circle the intersection of the lines drawn. The intersection shows the predicted Response Level. Information can be used to guide decision makers to the amount effort and documentation needed for the decision.

Response Level Progression Chart

