# Relative Risk & Complexity Analysis Guidance

The Relative Risk Assessment (Part B of the Risk and Complexity Analysis (RCA)) is completed using the following information as guidance. This assessment information is used as part of the process in determining the Organization needed to manage the fire (Part C of the Risk and Complexity Analysis). The Relative Risk Assessment is designed in a chart (below) or paper format (RCA) based on input variables of Values, Hazard, and Probability.
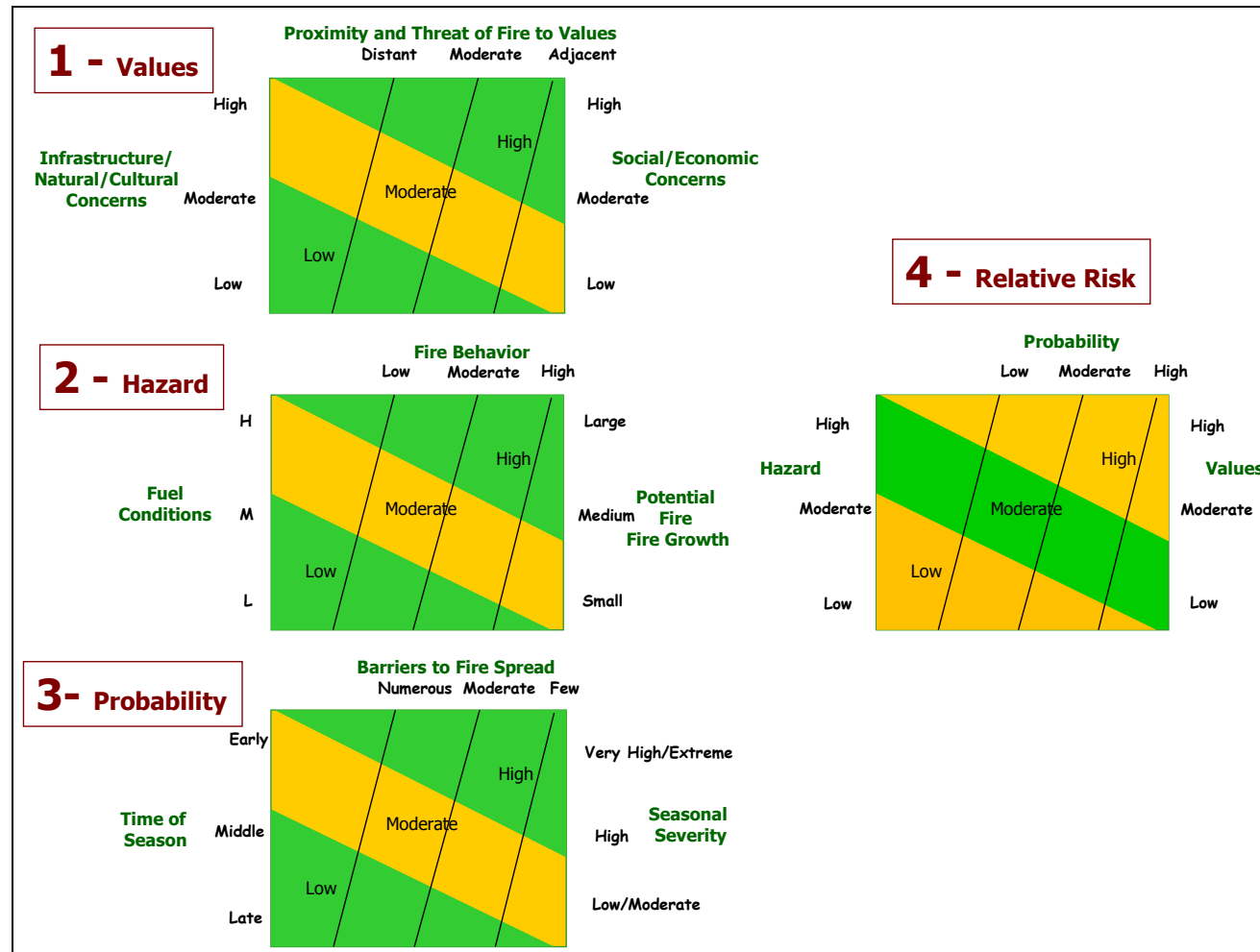
Guidance for Steps 1- 3 are on the following pages.

Complete Steps 1 -3: Connect the left and right elements with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right elements.

Take results as inputs to Step 4.

Complete Step 4: Read the relative risk from the background area where the intersection occurs.

Values Assessment: **Values are those ecologic, social, and economic concerns 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 and impacts are assessed within the context of the ecological role of fire in the ecosystem. Social values can include life, health, 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.**

1. *Infrastructure/Natural/Cultural Concerns*: Based on the number and kinds of values to be protected, and the difficulty to protect them, rank this element Low, Moderate, or High. Considerations include, but are not limited to, key resources potentially affected by the fire such as urban interface, structures, critical municipal watershed, commercial timber, developments, recreational facilities, power/pipelines, communication sites, highways, unique natural resources, special designated areas (i.e. wilderness), T&E species habitat, and cultural sites.

   The following guidelines can help you determine the appropriate Low, Moderate or High selection for the *Natural/Cultural Resource and Infrastructure Values* element:

Low	Moderate	High
• Values generally are benefited or are not impacted by fire. Ecosystem is resilient. Mitigation measures are effective.	• Concerns exist for impacts to resources or values but available mitigation measures are generally effective. • May require commitment of specialized resources	• Multiple values with concerns exist, and effectiveness of needed mitigation measures is not well established. • Severe damage likely without significant commitment of specialized resources.

2. *Social/Economic Concerns:* Evaluate the potential impacts (risk or effects) of the fire to social and/or economic concerns and rank this element **Low**, **Moderate** or **High**. Considerations include, but are not limited to, impacts to social or economic concerns of an individual, business, community or other stakeholder; degree of support for the wildland fire program and resulting fire effects; other fire management jurisdictions; tribal subsistence or gathering of natural resources; air quality regulatory requirements; public tolerance of smoke, including health impacts; potential for evacuation and ingress/egress routes; and restrictions and/or closures in effect or being considered.

The following guidelines can help you determine the appropriate Low, Moderate or High selection for the *Social/Economic Concerns* element:

Low	Moderate	High
• Local support for the use of wildland fire and its ecological role of fire is high. • The fire should have limited temporary or no impact on subsistence or Tribal activities involving treaty rights. • The fire is expected to remain within a single jurisdiction or agreements are in place to allow fire to move across several jurisdictions. • Media coverage is favorable. • Few structures or business ventures are potentially affected by the fire. • There are few impacts to recreation and tourism.	• Local support of use of wildland fire and its ecological role is clearly divided between supporters and opponents. • The fire will have some impacts on subsistence or Tribal activities involving treaty rights. • The fire is expected to involve more than one jurisdiction, cooperator, or special interest group and agreements need to be developed. • Media coverage tends to be a mix of favorable and unfavorable views. • Structures may be threatened by the fire or some business ventures may be affected by the fire.	• Local support for use of wildland fire and its ecological role is low. • The fire will have long-term impacts on subsistence activities or Tribal activities involving treaty rights. • Smoke impacts may become a concern for higher level air quality regulatory agencies and people with health risks. • The fire is expected to involve several jurisdictions, cooperators, and special interest groups and agreements requiring substantial negotiation need to be developed. • Media coverage tends to be unfavorable. • Many structures or private properties could be threatened.

3. *Proximity and Threat of Fire to Values*: Evaluate the potential threat to values based on their proximity to the fire, and rank this element **Low**, **Moderate** or **High.**

The following guidelines can help you determine an appropriate selection for the *Proximity and Threat of Fire to Values*:

Low (Distant)	Moderate	High (Near)
Fire is located where it is highly unlikely that it would reach the values given fire activity and the fuels between it and the values.	Fire could potentially reach the values, but will take multiple burning periods and sustained fire activity in the adjacent fuels to reach the values.	Fire is close to values. Without mitigation actions, fire is expected to reach the values.

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

1. *Fuel Condition*: Consider fuel conditions where fire is currently burning and where it will be burning and rank this element **Low**, **Moderate** or **High**. Evaluate fuel conditions that exhibit high ROS and intensity for your area, such as those caused by invasive species or insect/disease outbreaks; and/or continuity of fuels.

   The following guidelines can help you determine an appropriate selection for the *Fuel Conditions*:

Low	Moderate	High
• Fuel loading is low. • Large-scale fuel treatments have reduced continuous fuels. • No evidence of insect/disease outbreaks. • Changes resulting from insect and disease outbreaks are minimal. • Few if any fire return intervals have been missed and fuel complexes are similar to historic levels. • Invasive species do not contribute to increased fire spread or intensity.	• Fuel load is moderate and supports active fire spread. • Past fuels treatments may no longer be effective, or recent treatments have temporarily increased dead fuel loading. • Evidence of insect/disease outbreaks (red needles, dead standing timber, etc.). • Some fire return intervals have been missed, fuel complexes have been altered and present potential for fires with severity and intensity levels in excess of historic levels. • Invasive species contribute to fire spread.	• Fuels are continuous on the landscape and will readily support continued fire growth. • No fuels treatments have occurred. • Moderate to extensive insect/disease outbreaks and large stands of dead standing timber. • Significant vegetative changes from the historic situation have occurred. • The highly altered composition and structure of the vegetation predisposes the landscape to fire effects well outside the historic range of variability. • Invasive species greatly contribute to uncharacteristic fire spread and intensity.

2. *Fire Behavior:* Evaluate the current and expected fire behavior and rank the element **Low**, **Moderate** or **High**. Considerations include intensity, rates of spread, crowning; and profuse or long-range spotting.

The following guidelines can help you determine an appropriate selection for *Fire Behavior*:

Low	Moderate	High
• Short duration flaming front with occasional torching. • Fuels are uniform and fire behavior can be easily predicted and tactics implemented.	• Short range spotting occurring. • Moderate rates of spread are expected with mainly surface fire and torching. • Fuels and terrain are varied, but don't pose significant problems in holding actions.	• Long range spotting > ¼ mile. • Extreme rates of spread, and <u>crown fire activity</u> are possible. • Fuels, elevation, and topography vary throughout the fire area, creating high resistance to control.

3. *Potential Fire Growth:* Evaluate the potential fire growth, and rank this element **Low**, **Moderate**, or **High**. Considerations would include current and expected fire growth based on fire behavior analysis and the weather forecast and/or the ability to control the fire.

The following guidelines can help you determine an appropriate selection for *Potential Fire Growth*:

Low	Moderate	High
• Little fire growth is expected. • Weather conditions (current and forecasted) are such that fire growth will be low. • Resistance to control, if implemented, for dominant fuel type is low.	• Fire behavior leads to moderate fire growth. • Weather conditions are not forecasted to worsen. • Dominant fuel type is burning readily but is predictable and characteristic of the time of year and conditions. • Control efforts implemented are typically successful and resistance to control for dominant fuel type is moderate.	• Fire growth is well beyond what is typical for the dominant fuel type. • Extreme fire behavior (torching, crowning, long range spotting, etc.) is occurring or predicted. • Weather conditions are predicted to worsen (hotter, drier, windier). • Dominant fuel type is burning more readily than usual and exhibiting greater than typical fire growth. • Resistance to control is high. Control efforts to date have been unsuccessful due to high rates of spread and rapid fire growth.

Probability Assessment – **Probability refers to the likelihood of a fire becoming an active event having potential to adversely affect values.**

1. *Time of Season*: Evaluate the potential for a long-duration fire and rank this element **Low**, **Moderate** or **High**. Time remaining until a season-ending event should be considered.

   Time of Season is the current time in relationship to the historical or peak fire season. 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 already occurred and managers can reasonably expect diminishing fire activity and behavior as time progresses.

   The following guidelines can help you determine an appropriate selection for *time of season*:

Low (Late)	Moderate (Middle)	High (Early)
• The current date is in the latter part of the historic fire season. • At least 2/3 of the historic period has passed. • The peak burning activity period has occurred. • The probability of a season-ending or fire-ending event is increasing quickly. • Weather forecasts and seasonal outlooks do not indicate an extended fire season.	• The current date is in the middle of the historic fire season. • At least 1/3 of that period has passed and no less than 1/3 remains. • The peak burning activity period either has occurred, is occurring now, or will occur very soon.	• The current date is in the early portion of the historic fire season. • At least 2/3 of the established fire season remains. • The peak of burning activity is still to come.

2. **Barriers to Fire Spread**: Evaluate the barriers to fire spread as a measure of natural defensibility of the fire's location and an indication of the degree of potential mitigation actions needed and rank this element **Low**, **Moderate** or **High.**

   Use the following table to help guide your selection for *Barriers to Fire Spread:*

Low (Many)	Moderate	High (Few)
• Many natural and/or human-made barriers are present and limiting fire spread. • Ridges, rocky slopes, wide drainages, roads and other fuel breaks will contain the fire along much of its perimeter	• Some barriers are present and limiting fire spread • Ridges, rocky slopes, wide drainages, roads, and other fuel breaks will slow or contain the fire along portions of the perimeter.	• No barriers are present. • Few, if any, ridges, rocky slopes, wide drainages, roads and other fuel breaks are present.

3. **Seasonal Severity**: Evaluate fire danger indices and rank this element **Low/Moderate**, **High** or **Very High/Extreme**. Considerations include fire danger indices such as energy release component (ERC), drought status, live fuel moistures, adjective fire danger rating, and geographic area preparedness level.

Use the following table to help guide your selection for *Seasonal Severity:*

| Low/Moderate	High	Very High/Extreme
• Measures of fire danger are below or at seasonal averages. • Drought status is within seasonal norms with no long-term drought present • Live and dead fuel moistures are at or higher than seasonal averages.	• Measures of fire danger are above seasonal averages, but conditions are not present for large fire growth (measures are below the 90th percentile). • The area may be experiencing a short-term seasonal drought, but is not considered to be in long-term drought. • Live and dead fuel moistures are lower than seasonal averages.	• Measures of fire danger are or are expected to become well above critical percentiles (typically 90th –97th percentile) seasonal averages, or setting new records. • The area is considered in a drought situation for more than one year and as much as 3 or more years (long-term drought). • Live and dead fuel moistures are well below seasonal averages and have reached critical values.

Organization Assessment Help Content

The Organization Assessment (Part C of the Risk and Complexity Analysis (RCA)) is completed using the following information as guidance. This assessment information is combined with the Relative Risk Assessment information to determine the organization needed to manage the fire. The Organization Assessment is designed in a chart (below) or paper format (RCA) based on input variables of Relative Risk, Implementation Difficulty, and Socio/Political Concerns.
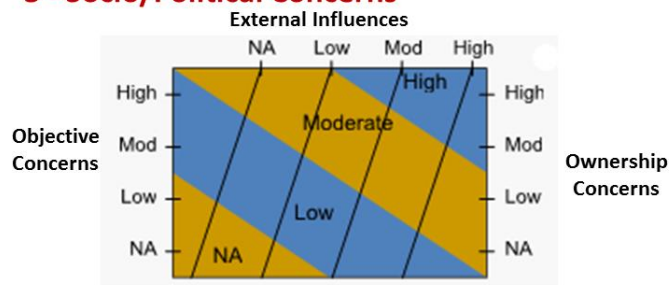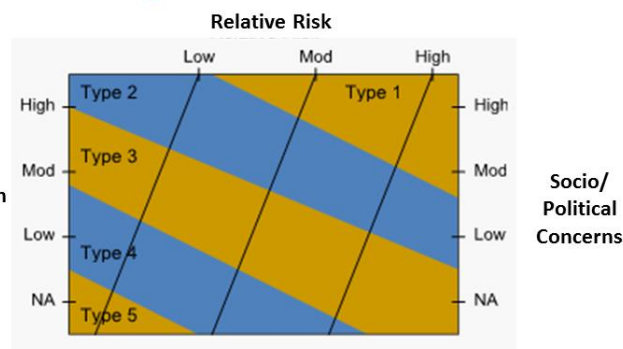
1: Relative Risk

Probability

2 - Implementation Difficulty

Incident Strategies (Course of Action)
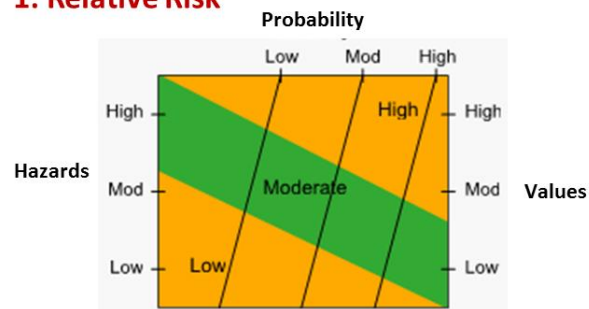
3 - Socio/Political Concerns
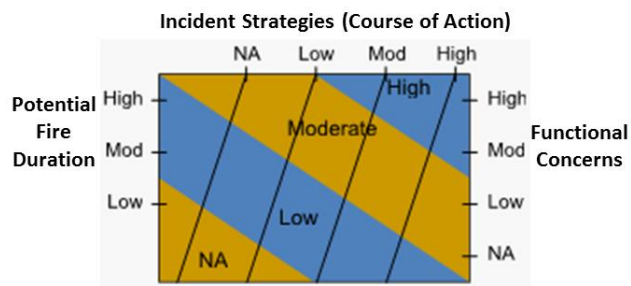
External Influences

4 - Organization Assessment

Relative Risk

Guidance for completing the Implementation Difficulty and Socio/Political Concerns are on the following pages.

The Relative Risk has been completed above and should be copied here.

Complete Steps 2-3: Connect the left and right elements with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right elements.

Take results as inputs to Step 4.

Complete Step 4: Read the Organization Assessment from the background area where the intersection occurs.

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Implementation Difficulty – The Implementation Difficulty is a measure of how the specific circumstances that may be associated with a particular fire combine to represent potential intricate implementation concerns. While many specific situational elements have been addressed by the Relative Risk, special functional concerns and the requirement to implement the selected course of action to meet the incident objectives and requirements are addressed here.   This assessment area also allows opportunity for the Agency Administrator to identify local information in regard to historic fire duration, special needs and concerns, and potential tactical responses.

1. *Potential Fire Duration*: Evaluate the estimated length of time that the fire may continue to burn. Rank the element as **low (short)**, **moderate**, or **high (long)**. (Within the WFDSS system, this element is rated during the Relative Risk Assessment process and transferred to the Organizational Needs Assessment.)

    The following guidelines can help you determine an appropriate selection for *potential fire duration*:

N/A (Very Short)	Low (Short)	Moderate	High (Long)
• Fire is contained and there are very few or no threats to it breaching containment lines. • Fuel type or conditions, weather or time of year is limiting fire spread.	• Fire is expected to persist for only a short time. • Fire spread is limited by fuel type or conditions, weather or time of fire season. • The probability of a season-ending or fire-ending event is increasing quickly.	• Fire is expected to last for a moderate period of time requiring mid-term planning and actions. • Fuel type or condition, weather and time of season may support some fire spread. • Season ending event has not occurred and is not predicted to occur in the next few weeks.	• Fire is expected to last for a long period of time requiring long term planning and continual management efforts. • Active fire spread is supported by fuel type and condition, weather, and time of year. Season ending event is not predicted to occur for a number of weeks or months.

2. *Incident Strategies*: Evaluate the level of firefighter and aviation exposure required to successfully meet the current strategy and implement the course of action. Rank this element as **N/A (Very Low), Low, Moderate, or High**. Considers the likelihood that those resources will be effective; exposure of firefighters; reliance on aircraft to accomplish objectives; and whether there are clearly defined trigger points.

Use the following table to help guide your selection for *Incident Strategies:*

N/A (Very Low)	Low	Moderate	High
- Potential firefighter exposure is very low due to limited or few resources on the fireline. - Limited or no actions being taken on the fire. - Periodic assessment set at maximum number of days because fire environment is stable.	- Few personnel on the fireline with simple management activities. - Fireline activities may involve occasional actions to delay, direct, or check fire spread in some areas or development of management action points. - Firefighter exposure low due to a limited number of resources assigned, limited action or simple actions being taken on the ground. - Periodic assessment frequency is set at or near maximum interval because the fire environment is not readily changing.	- A mix of ground and air resources involved but the fire environment is only moderately dynamic and actions are non-complex. - Combinations of simultaneous actions (monitoring/areas of direct perimeter control) may be taking place. - Restrictions or closures considered or may be in place. - Firefighter exposure is at moderate levels because of the varied resources being deployed, a moderately dynamic strategy, and limited values are threatened. - Periodic assessment frequency is set at intermediate levels because changes to strategies and tactics are not occurring regularly.	- Management actions involve a variety of resources, are complex and the strategies are dynamic. - Restrictions or closures in place or are taking place real time and expanding. - Firefighter exposure at maximum levels due to the complexity of the actions being taken, the multitude of unlike resources, and values at risk. - Daily periodic assessments are taking place because the fire environment is changing requiring updates to the decision or consideration by the local unit.

3. **Functional Concerns**: Evaluate the needed organizational structure to adequately and safely manage the incident, and rank this element as N/A (minimal resource committed), **low** (adequate), **moderate** (some additional support needed), or **high** (current capability inadequate)**.**

Considerations include: Incident management functions (logistics, finance, operations, information, planning, safety, and/or specialized personnel/equipment) are inadequate and needed; availability of resources; access to EMS support; heavy commitment of local resources to logistical support; ability of local businesses to sustain logistical support; substantial air operation which is not properly staffed; worked multiple operational periods without achieving initial objectives; incident personnel overextended mentally and/or physically; Incident Action Plans, briefings, etc. missing or incomplete; performance of firefighting resources affected by cumulative fatigue; and ineffective communications.

Use the following table to help guide your selection for *Functional Concerns:*

N/A (Very Low)	Low	Moderate	High
• Few or no resources required on the fire. • Local resources are utilized or resources can be easily ordered. • Special support personnel not necessary. • No specific IAP required, routine briefing and communications suffice. • Safety issues are easily identified and mitigated. • Terrain and fuels do not affect action or make the incident challenging to support.	• Existing management organization adequate or can be downsized. • Resources are available to support actions. • Special support personnel not necessary. • Necessary frequency for IAP's less than daily. • Safety issues are easily identifiable and mitigated. • Terrain and fuels are such that actions are easily supported.	• Existing management organization is too small or does not match the complexity/incident strategies making it difficult to achieve the incident objectives. • Availability of resources may be limited. • Special support personnel are needed. • Safety hazards have been identified and can be mitigated. • Terrain and fuels are such that actions are a challenge to a simple organization.	• Current fire size warrants three or more divisions or potential exists for increased functional areas. • Special functional positions (C&G) or units are needed. • Adequate resources may be limited or difficult to obtain. • Substantial aviation operations are taking place requiring significant staffing. • Complex operations are taking place which lead to extensive safety management. • Terrain and fuels make actions challenging to support.

Socio/Political Concerns – The Socio/Political Concerns are an indicator of how difficult and involved the decision is for the specific situation that may be associated with a particular fire. Key areas that influence and affect an Agency Administrator's decision space and range of options include: the type of objectives to be implemented on the fire; the particular ownership situation; and any external influences that may exert strong influences on the Agency Administrator and his/her decision. This assessment area also allows the Agency Administrator to identify local information with attention to fire activity, local public and political opinions, and local knowledge.

1. *Objective Concerns*: Evaluate the complexity of the incident objectives and rank this element as **N/A (very low)**, **low**, **moderate**, or **high**. Considerations include: clarity; ability of current organization to accomplish; disagreement among cooperators; tactical/operational restrictions; complex objectives involving multiple focuses; and objectives influenced by serious accidents or fatalities.

   The following guidelines can help you determine an appropriate selection for *objective concerns*:

N/A (Very Low)	Low	Moderate	High
• Single objective that is easily achievable, with little or no potential to shift.	• Objectives are simple and easily implementable with no expected change. • Course of action is meeting incident objectives. • Incident objectives and requirements clear and easily derived from strategic objectives and management requirements.	• Multiple objectives being implemented simultaneously and are moderately hard to achieve. • WFDSS decision(s) have been published and course of action is meeting objectives. • Incident objectives and requirements clear.	• Objectives may compete among cooperators and are difficult to achieve. • Objectives are complex requiring multiple tactics on various parts of the fire. • Multiple objectives with high likelihood of shifting emphasis between resource benefits and protection. • WFDSS decisions and course of action may be in need of or may be in process of being revised.

2. **Ownership Concerns**: Evaluate the effect ownership/jurisdiction will have on how the fire is managed and rank this element **N/A (Very Low), Low, Moderate, or High**. Considerations include disagreements over policy, responsibility, and/or management response; fire burning or threatening more than one jurisdiction; potential for unified command; different or conflicting management objectives; potential for claims (damages); and disputes over suppression responsibility.

   Use the following table to help guide your selection for *Objective Concerns:*

N/A (Very Low)	Low	Moderate	High
• Fire is burning on a single unit and is not expected to leave that jurisdiction.	• Fire burning on a single unit in one jurisdiction. • Cooperators not involved in operations. • Risk to neighboring values is low and/or can be easily addressed.	• Simple joint-unit fire. • Concerns over responsibility may exist. • Moderate concerns with conflicting incident objectives and course of action supporting across the units involved.	• Multi-jurisdictional fire burning or has potential to burn onto multiple units of different jurisdiction and/or private lands. • Potential for unified command. • Potential disagreement over responsibility. • Differing fire policies across jurisdictional boundaries and cooperators. • High concerns over protection of values and jurisdictional responsibility for the values. • Diverse objectives/requirements, and course of action across the jurisdictions.

3. **External Influences**: Evaluate the effect external influence will have on how the fire is managed and rank this element as **N/A (Very Low), low**, **moderate**, or **high.**

Considerations include increasing media involvement, social/print/television media interest; threat to safety of visitors from fire and related operations; restrictions and/or closures in effect or being considered; preexisting controversies/relationships; smoke management problems; and sensitive political concerns/interests.

Use the following table to help guide your selection for *External Influences:*

N/A (Very Low)	Low	Moderate	High
- No impact on neighbors or visitors. - No controversy. - No media interest, no sensitive media relationships. - No smoke management concerns.	- Few impacts on neighbors or visitors. - No controversy. - Little media interest or sensitive media relationships. - Few, if any smoke management concerns. - External attention focused at the local level only.	- Some impact on neighbors or visitors - Some relationships/closures/political controversy, but mitigated. - Press release issued, but minimal media activity during operations. - Potential for smoke management concerns, but smoke impact mitigated. - External attention focus may elevate to state, regional, or area level and Agency leaders at these levels.	- High impact on neighbors or visitors - High internal or external interest and concern. - Pre-existing controversy/local or regional relationships. - Media present during operations. - High likelihood of smoke impacts to multiple smoke sensitive areas with complex mitigation actions required - Visibility complaints likely. - Attention focus may elevate to national levels and Agency leaders. - Highly sensitive political interests.