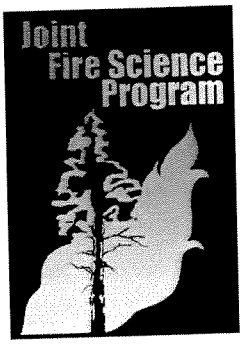
Joint Fire Science Program

Evaluation Resource Guide for Joint Fire Science Program Consortia



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Overview and Purpose

The Joint Fire Science Program (JSFP) is an interagency research partnership between the US Department of Interior and the US Department of Agriculture. The JFSP funds a national network of regional Consortia designed to improve access to and application of fire science research results and tools. These Consortia comprise collaborative partnerships involving federal, state, local, and public, private, non-profit and research agencies and organizations.

Common Consortia goals include coordinating current fire science delivery efforts, increasing communication and collaboration between fire managers and fire scientists, and facilitating the dissemination and application of current fire science information among researchers, fire managers, policymakers, and the general public. Each consortium has developed a variety of educational activities designed to improve the linkage between fire science research and application.

Coincident with public demand for greater accountability in the use of public funds, public agencies have increased, and enforced the requirement for funding recipients to measure and document program impacts. The JFSP prioritizes evaluating and communicating the impacts of its educational outreach activities as an important component in improving fire science research delivery and application.

This guide is designed to support these efforts by increasing the knowledge and skills necessary to evaluate Consortia educational activities effectively and consistently. It reviews eight topic areas critical to effective program evaluation which are:

- Program Planning
- Evaluation Planning
- Evaluation Questions and Design
- Evaluation Methods
- Collecting and Handling Data
- Analyzing and Interpreting Data
- Communicating Evaluation Results
- Evaluation Ethics

Each topic area is defined and resources provided to help develop quality evaluation plans for JFSP Consortia educational activities. A specific emphasis is placed on the logic model. The guide includes appendices which contain additional tools that may be useful in planning and implementing a comprehensive evaluation. Finally, this guide also includes basic templates that may be adapted for use in evaluating JFSP Consortia educational activities within the context of a logic model.

The purpose and development of the JFSP online evaluation, a component of the external aggregate evaluation of Consortia activities, is described and discussed to provide an example of instrumentation (see Appendix A). It is expected that individual consortium evaluations will vary substantially which makes the development of a one size fits all evaluation instrument and methodology challenging. However, this example may be useful to illustrate how to develop question items to assess program outcomes in terms of a hypothetical JFSP logic model also provided.

Appendix B includes basic questionnaire templates that Consortia may adapt in evaluating their educational activities. Also included in Appendix B are brief descriptions of different types of available statistical analysis that may be applied to evaluative data.

Why is Evaluation Important?

As criteria for receiving continued funding and to improve fire science delivery, measuring and reporting program impacts are required of JFSP Consortia. Thus, it is critical for JFSP Consortia investigators[1] to demonstrate the impact of their educational activities. This is typically accomplished as part of an overall comprehensive program evaluation. Program evaluation should be an integral component of program development. As such, how a program is to be evaluated should be considered in the program planning stage.

Logic models are increasingly used and endorsed by community education professionals to reveal the linkages between program development activities and evaluation outcomes. Development of a program logic model is often the first step in program evaluation planning. The logic model approach to program development is intended to clarify the purpose of the educational program and identify potential obstacles to achieving success prior to program implementation. A logic model is useful in planning how to measure and report accomplishments as well as any program adaptations that may have been necessary.

Program evaluations serve multiple purposes. These include:

- Provide overall program accountability;
- Monitor program effectiveness in order to adapt activities as needed to reach targeted outcomes;
- Increase knowledge to help formulate new theories;
- Acquire knowledge and experience to develop and encourage best practices;
- Maintain oversight of and effectively manage program staff; and
- Comply with the requirements of program funding sources.

Evaluation results provide powerful information. Such information can be used to justify a program's design, validate the resources spent, determine if educational goals were reached, and assess the extent to which the program adequately addressed the situation for which it was intended.

There is no single best approach or method to evaluate all programming efforts, just as there is no single best approach to delivering programs. These concepts are reflected in the ecological, geographic and cultural diversity of the funded JFSP Consortia. This diversity of programming purpose results in differing levels of program design, duration, and intensity, necessitating unique program evaluation strategies for each consortium and their proposed educational activities.

JFSP Consortia investigators, and program staff, need to be knowledgeable and creative in designing, implementing, and reporting their program evaluation efforts. When correctly used, quantitative, qualitative, ethnographic, narrative, economic, and other evaluation methods are *equally beneficial* to ascertain program impacts.

Sensitivity to differences in learning objectives, target audiences, and teaching methods is critical to understanding the appropriateness of the evaluative approach used and the results obtained. Finally, if a goal of a program evaluation is dissemination of the evaluation results through peer-reviewed publication, then Institutional Research Board (IRB) certification should be sought and obtained.

Because of the complexity of community-based educational programs, collaborative approaches, when possible, often result in more effective evaluations. This is often the case in terms of cluster evaluations, where diverse data collection methods within the same evaluation design can contribute unique information on program effectiveness.

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[1] This guide refers to leaders and planners of JFSP Consortia programming as JFSP Consortia *investigators*.

Evaluations need to be congruent with program scope and intensity. Abundant program resources, high program dosages (or frequent educational interaction with participants), and ambitious educational goals, require thoughtful approaches and more rigorous evaluation designs.

For these reasons, evaluation planning ideally should coincide with the inception of program development. While JFSP Consortia should collaborate on program evaluation design and methods when possible, no single evaluation type, method, or approach can be used for all Consortia, given the scope and diversity of JFSP Consortia educational activities.

Also, because the evaluation of a single outreach educational program requires diverse skills, it is difficult for any JFSP Consortia investigator to become an evaluation expert. Therefore, JFSP Consortia investigators are encouraged to work with others who have complementary skills. The JFSP Consortia program development effort will benefit from collaborative teamwork in evaluating its educational activities.

Evaluation Types

For the purposes of the JFSP Consortia, program evaluation targets educational activities that are developed and implemented. In this context, program evaluation measures what happened as a result of a planned educational activity, based on pre-established program goals and learning objectives.

Although many types of evaluation have been identified in the research base, two are particularly relevant to the educational mission of JFSP Consortia: formative or process evaluation and summative or outcome based impact evaluation. Each can significantly contribute to the overall quality of JFSP funded programming.

Formative (process) evaluation is typically conducted for the purpose of improving or refining a program. It examines a program as it develops by scrutinizing its educational activities. It may involve pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation assesses program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions). Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals. It usually occurs at the conclusion of the program or at planned benchmark points during program implementation. It is often conducted by an external evaluator in order to increase objectivity.

Both formative and summative evaluation involves comprehensive planning. This includes the establishment of measurable collaborative process goals and objectives, the identification of methods and sampling strategies, the description of implementation strategies, and the outline of data analyses and reporting tactics.

JFSP requires that its Consortia investigators and staff become increasingly competent in these types of program evaluation in order to:

- Objectively and consistently measure program outcomes and impacts;

- Modify and strengthen educational activities as needed based on evaluative information;
- Report program outcomes and impacts; and
- Continually strengthen programming in order to sustain Consortia as effective outreach infrastructure to increase the delivery and use of fire science information.

At the same time, it is acknowledged that the types of desired outcomes and impacts important to JFSP Consortia may not become evident until sometime after the educational activities or experiences have occurred. In addition, JFSP Consortia target audiences may be highly heterogeneous in terms of age, culture, learning styles, fire science role, and geographic place.

For these reasons, JFSP Consortia program impacts may be more complicated and/or time consuming to assess than traditional classroom educational activities. This added complexity accentuates the importance of planning.

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Topic 1: Program Planning

Program planning involves the selecting and mapping a theory of action. That is, outreach programs exist for the purpose of responding strategically to a particular situation in order to change the situation, presumably to bring about improvements. Ideally, that situation has been defined and framed objectively through a formal needs assessment. Logic modeling, or graphically mapping a program to implement a theory of action, can help to better clarify and understand program purpose and goals.

Logic modeling is a thought process that evaluators have used since the 1970s. It has regained notoriety in the past decade as a standard tool for planning, implementing and evaluating many federally funded community educational programs.

Effective evaluation and program success depends upon a clear understanding about how and why a proposed program will resolve a specific problem, generate new ways of understanding the problem, and optimize assets to address the problem. A logic model approach to program and evaluation planning can help to create a shared understanding of program goals and methods for reaching goals and projected outcomes.

At its simplest, a logic model requires identifying the *situation* the program is designed to address or change. It describes the *inputs* or resources necessary to invest in order to bring about the desired change(s). It then describes the next logical step, which are the *activities* (utilizing the inputs provided) in order to achieve the desired changes. It goes on to identify and describe the *outputs* resulting from combining inputs with activities. The outputs are the products, services and events that are intended to lead to the program's outcomes. Finally, it describes the program outcomes as anticipated/desired changes in knowledge levels, attitudes and behaviors necessary to bring about a long-term change in a situation. This is depicted as a societal improvement.

A logic model takes into consideration basic *assumptions.* These are certain beliefs and ideas, based on theory, research, and knowledge, that support the linkages that have been identified and described as inputs, outputs, and outcomes. It also considers *external factors.* These factors may affect a given program, but are beyond the control of the program leaders, developers or managers.

Logic models have a number of uses and can be applied to a variety of situations and audiences. Logic models are particularly useful for planning comprehensive outreach programs. Ideally, the exercise of completing a logic model for a particular program forces program leaders to clarify goals begin by identifying desired short, medium, and long-term outcomes within the context of the formally identified needs (situation). Working backwards, program leaders must determine how to reach the desired outcomes through educational activities, tools, and methods (inputs, activities and outputs).

Using logic models in this manner can serve to create a roadmap to achieving program outcomes, and thus success. As such, logic modeling may serve as a first step in designing quality program evaluations. The ability to map a program comprehensively can help to more easily identify indicators of change or impact. These identified indicators become evaluative criteria or measures.[2]

Logic modeling may also be used to involve the target audience in program planning. This application includes guiding stakeholder groups to collaboratively develop program goals and identify activities to help learners reach program goals. In many cases, stakeholders are the learners and can provide very useful insight into program planning and development.

[2] The University of Wisconsin Extension website provides an interactive model that JFSP Consortia investigators may use in developing Logic models tailored to their particular Consortium's activities and targeted impacts.

Logic modeling may also help to explain program activities and desired outcomes to a broad group of program stakeholders and/or funding sources. A simplistic graphic depiction of program inputs, outputs, and outcomes can be a useful teaching as well as a planning tool.

Hypothetical JFSP Consortia Logic Model

A hypothetical logic model outlining potential connections between JFSP Consortia investments and impacts is displayed in **Figure 1**. This hypothetical model is intended to help JFSP investigators understand the potential linkages or relationships between various aspects of program planning, execution, and impacts. As resources, activities, and goals vary across Consortia, their individualized logic models will differ from this example and from one another. Despite these differences, logic models tailored to each consortium should be conceptually similar. Recognition of the **situation**, or current challenges and opportunities, is essential in planning any type of program or intervention. For instance, several Consortia have identified the opportunity to increase communication and collaboration between fire managers/practitioners and fire researchers/scientists.

Consortia may invest a variety of resources, or **inputs** (e.g., funding, staff, time) in developing and executing the programming, intervention, or activities designed to reach targeted populations in progressing towards their goals (**outputs**). With respect to the present example, outputs may include professional meetings, conferences, or an interactive website component designed to facilitate communication and networking among fire science professionals. Outputs also include participation- or who the program is designed to "reach."

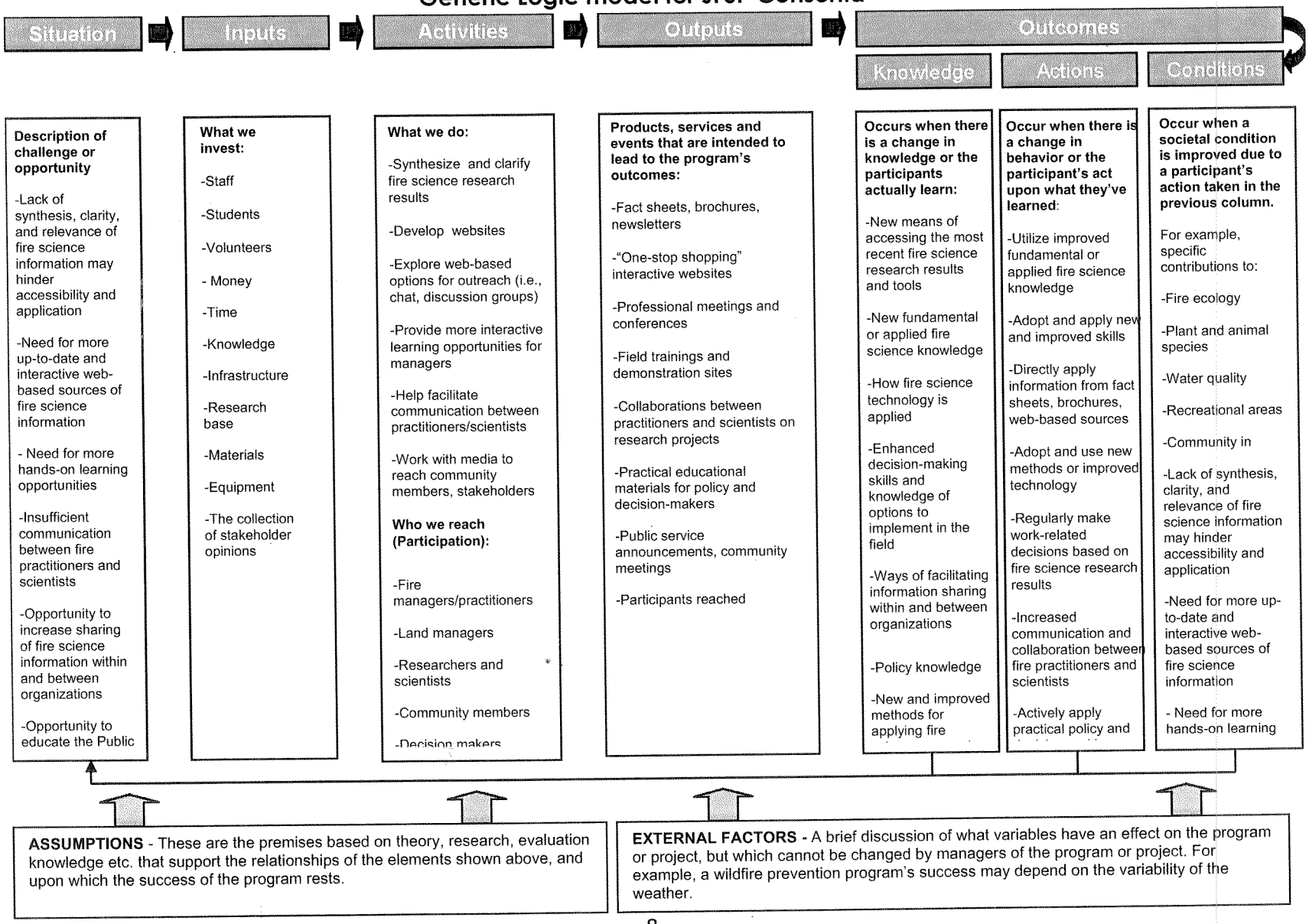
These outputs in turn should be linked to programming **outcomes**, or impacts. Such outcomes extend along a continuum. **Short-term outcomes** focus on learning and are evidenced by changes in knowledge, awareness, skills, opinions, and behavioral intentions. For instance, as a result of JFSP Consortia programming outputs, fire managers/practitioners may find fire scientists easier to approach and believe that fire science research is more trustworthy; fire scientists may be more motivated to consult local fire managers when working on research projects. **Medium-term outcomes** refer to actions, or changes in behaviors, decision making, policies, and/or social outcomes. Fire managers/practitioners and researchers/scientists actually collaborating on a research project is an example of a medium-term outcome of Consortia programming aimed at enhancing relationships between these populations.

Long-term outcomes refer to program effects on societal conditions (i.e., impacts on societal health and well-being; economic, environmental, and civic conditions). Assessment of such outcomes may be beyond the scope of evaluations of individual JFSP Consortia as such changes may emerge over several years. It is important, however, that Consortia anticipate and articulate the long-term outcomes of their interventions and activities. Improving the quality of relationships between fire practitioners and scientists is not a finite goal, but rather related to more distal outcomes (i.e., quality relationships should facilitate the dissemination and application of fire science research, which should in turn lead to improved societal conditions). Specific examples of potential short-, medium-, and long-term JFSP Consortia programming and activity outcomes are displayed in **Figure 2**. It also should be noted that each Consortium will bring different **assumptions** (i.e., beliefs about their programming activities and contextual features) and **external factors** (features of the environment in which the programming activities are executed), which will further impact their conceptualization of the relationships between logic model components.

Figure 3 provides a logic model worksheet that may be helpful to JFSP Consortia investigators in developing individualized program plans. This worksheet can also be used to aid in understanding the linkages between a given JFSP Consortium's fire science delivery strengths and needs, investments, outputs, and impacts.

Figure 1

Generic Logic model for JFSP Consortia



ASSUMPTIONS - These are the premises based on theory, research, evaluation knowledge etc. that support the relationships of the elements shown above, and upon which the success of the program rests.

EXTERNAL FACTORS - A brief discussion of what variables have an effect on the program or project, but which cannot be changed by managers of the program or project. For example, a wildfire prevention program's success may depend on the variability of the weather.

Figure 2

Definitions and Potential Examples of JFSP Consortia Program Outcomes

Program Outcomes - Planned results or changes for individuals, groups, communities, organizations, or systems. Types of outcomes include:

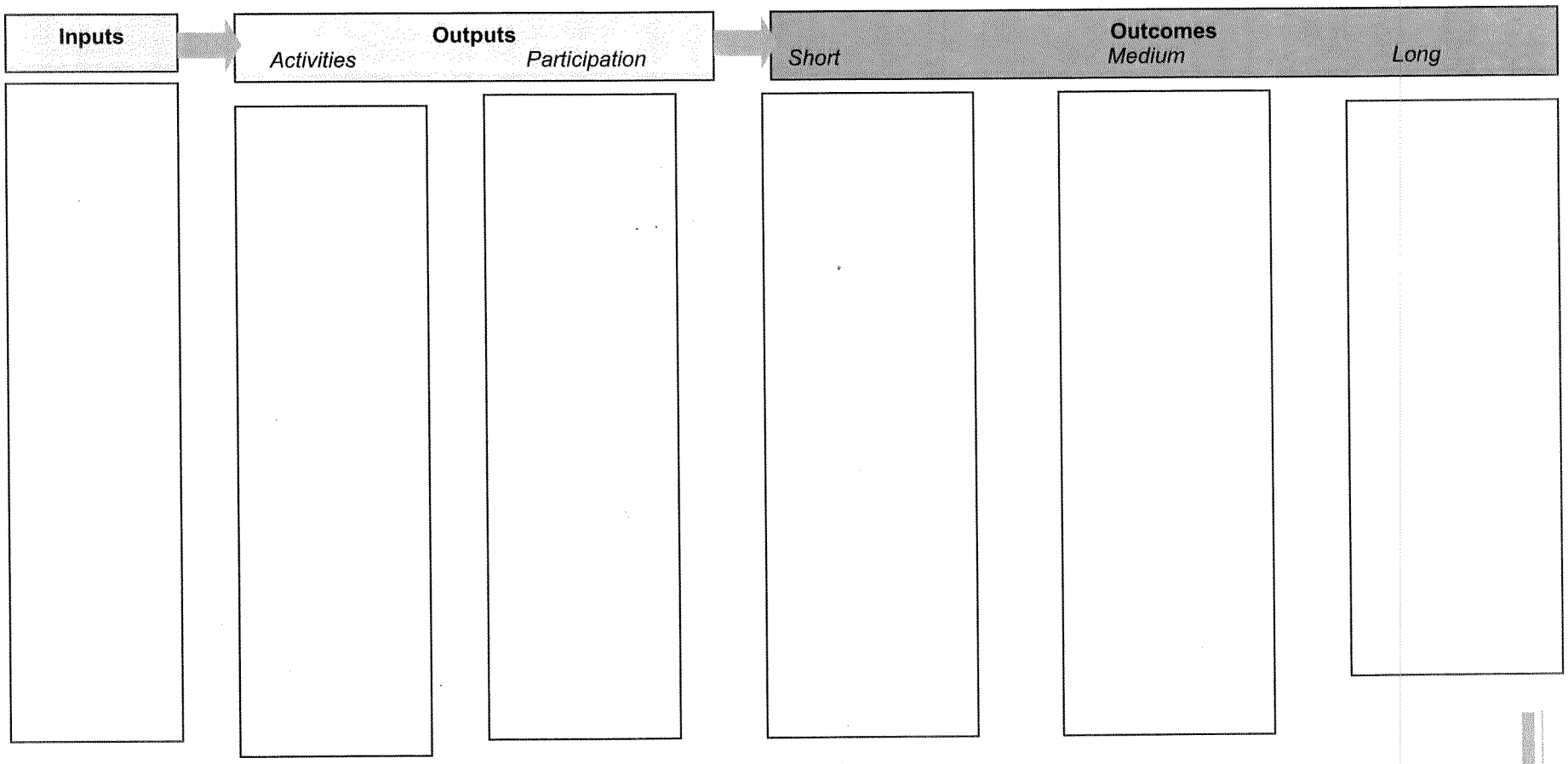
	DEFINITION	EXAMPLES
1. Change in Knowledge	Occurs when there is a change in knowledge or the participants actually **learn**:	• New understanding of the application of fire science research • Awareness of new sources of current fire science information and means of accessing those sources • Increased understanding of how to apply technology in the field • Enhanced decision-making skills and knowledge of options to implement in the field • Increased policy knowledge • New improved methods for applying fire science research results and tools
2. Change in Behavior and/or Action	Occurs when there is a change in behavior or the participants **act** upon what they've learned.	• Utilization of improved fundamental or applied fire science knowledge • Adopt and implement new and improved skills • Directly apply information from fact sheets, brochures, newsletters • Adopt and use new fire science methods or improved technology • Increase communication and collaboration with fire practitioners/scientists • Actively apply practical policy and decision-making knowledge • Changes in organizational practices (e.g., increased collaboration between and within organizations, increased sharing of fire science research results and tools)
3. Changes in Condition	Occurs when a **societal condition** is improved due to a participant's change in action. These are usually changes in Social, Economic, Civic, and Environmental conditions. Synonymous with Impact. Includes changes in conditions as a result of the change in behavior based on knowledge learned.	• Fire ecology improves • Cultural and economic resources are preserved • Higher water quality and a cleaner environment • Improved wildlife habitat and biodiversity • Increased access to recreational areas • Protection of human health, life, and property, • Shared responsibility for living with wildfire

Figure 3

This template is designed to help identify program inputs, outputs, and outcomes in terms of the logic model. Inputs (what a Consortium invests in order to produce desired outcomes) can be listed in the first box. The Outputs a Consortium produces can be listed in the next section, designed to capture a variety of activities and the participants reached. Each Consortium likely anticipates multiple short and medium term outcomes resulting from such Outputs, which may be articulated in the third section. Ultimately, these short and medium-term outcomes should produce more substantial changes in conditions, which may be identified in "Long-term Outcomes" box.

Program:___(name)___Logic model (uses text boxes: add/change boxes and arrows as needed)

Situation:



NOTES:

Resources to Assist with Program Planning

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Topic 2: Planning an Evaluation

Careful evaluation planning is directly connected to the quality of the evaluation results, and is a critical first step in the evaluation process. This topic area addresses the different purposes and types of program evaluation. A special emphasis is placed on developing evaluation questions that are linked to the educational program's theory or framework.

Developing impact indicators and identifying data sources is also critical at this phase. To clarify and understand the purpose for program evaluation requires having either conducted and/or reviewed the results of a comprehensive needs assessment.

The results of the needs assessment influence evaluation and logic model planning by identifying needs to address through educational outreach. The subsequent logic model describes the needs or situation and logically links the educational activities (inputs and outputs) with anticipated outcomes and expectations.

Evaluation of a comprehensive educational outreach program necessitates having clear program goals that include striving to achieve particular knowledge gains, attitude, and behavioral changes. Evaluation planning questions to ask, for example, may include:

- Is the intention of evaluation to provide an overall measure of the net worth of the JFSP Consortia?
- Is the intention to determine if the JFSP Consortia effectively addressed or resolved the problem/situation?
- Is the intention to determine how to improve specific elements of the JFSP Consortia program with the goal of improving fire science delivery?

Outlining the purpose of the evaluation includes determining who is doing the evaluation, who will participate in the evaluation, and who will be the recipient of evaluation results, or the audience for the evaluation? Probing questions to ask, for example, include:

- Will the evaluation of educational activities be conducted by a third party not involved directly with the JFSP Consortia and is neutral about the outcome of the evaluation?
- Will the evaluation be conducted by the Consortia program staff?
- Will evaluation participants include the JFSP Consortia program participants?
- Will evaluation participants include the general public?

In terms of identifying the audience or recipients of the evaluation information, clarifying questions involve merging the intention of the evaluation with potential recipients of the resulting information and include:

- Will the evaluation results be used to clarify the situation, acquire additional information, and/or expand the number of participants and interests?
- Will the results demonstrate cost-effectiveness of the program to funding sources?
- Will the results be used to inform policy makers about the issue(s)? The program effects?
- Will the results be used to inform the general public, who may have a stake in the issue and whose tax dollars may have helped to subsidize the program?
- Will the results be used to help develop theories and models to advance the Consortia program goals and objectives?

It is important to develop as complete as possible an understanding of who will be the recipients of the evaluation results. It is also important to know what these audiences want to know and why and what they plan to do with the information—how will they use it. Finally, a comprehensive evaluation plan (and evaluator) secures agreement from the prospective evaluation participants their willingness to participate. They should also receive assurances of confidentiality and all means possible to protect their anonymity.

Figure 4 provides a worksheet to help begin the planning process. Ideally, JFSP Consortia investigators may involve staff and selected stakeholders to help complete the questions.

Figure 4. Evaluation Planning Questions

Who are the key program stakeholders?
Who are the key stakeholders of the evaluation results?
How will the evaluation results be used?
Which methods will be used to collect the data?
What is the most effective protocol for collecting evaluation information?
What are the ethical issues to consider?
How will the data be analyzed?
How will the data be validated?
How will the evaluation findings be communicated?

Figure 5 provides a worksheet to assist with planning the evaluation of JFSP Consortia educational activities. The components of a logic model are provided to help generate ideas for developing impact indicators in the program planning process. Impact indicators to measure short, medium, and long-term outcomes may be used to develop evaluation questions (see Topic 3).

Figure 5. Evaluation Planning Worksheet

Assumptions	Identify indicators of change and data sources
Resources	Identify indicators of change and data sources
Activities	Identify indicators of change and data sources
Outputs	Identify indicators of change and data sources
Short-Term Outcomes	Identify indicators of change and data sources
Medium-Term Outcomes	Identify indicators of change and data sources
Long-Term Outcomes	Identify indicators of change and data sources

To summarize, evaluation planning includes creating an evaluation protocol, timeline, and overall management plan. The goal of evaluation planning is to identify indicators of change, identify data sources, develop evaluation questions, and manage and monitor the program evaluation process. In planning program evaluation, it is helpful to review previously published evaluative research. These examples may be used to inform the value and logic of each consortium's proposed evaluation plan. The following resources may assist with planning evaluation of JFSP Consortia educational activities.

Resources to Assist with Evaluation Planning

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Topic 3: Evaluation Design

Evaluations are only as effective as the questions that drive them. Developing key evaluation questions that accurately measure outcomes and impacts is critical to collecting meaningful evaluative data. It is important to invest time to carefully develop and write questions that accurately measure identified indicators of impacts and outcomes.

Learning about the types of questions that can be used in evaluation is important. JFSP Consortia investigators are encouraged to work with an evaluation mentor or team to develop viable questions in order to effectively measure indicators and assess logical links between outcome goals and questioning strategies.

Evaluation design includes:

- Generating, testing, and editing questions based on program learning objectives.
- Adapting evaluation questions to audience and methods.
- Linking appropriate impact indicators to program outputs and outcomes.
- Selecting and applying appropriate evaluation methods (see Topic 4).
- Adjusting or augmenting evaluation design to changes in learners' progress or program goals.

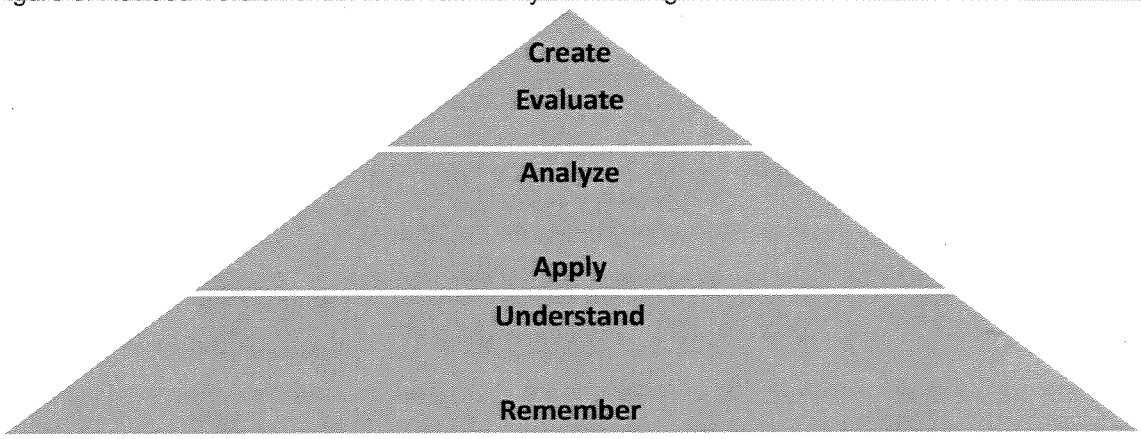
Developing evaluation questions requires having established clear learning objectives for program participants. Evaluation questions can then be linked to learning objectives and, following the logic model, indentified program outcomes and impact indicators.

In 1956, Benjamin Bloom and colleagues created a multi-tiered model (Bloom's Taxonomy) of classifying thinking that illustrates the cognitive learning process. The lowest three levels are: remember, understand, and apply. The highest three levels are: analyze, evaluate, and create. The taxonomy is hierarchical in that it depicts the learning process as progressive, moving from basic cognitive processes to more advanced processes. In other words, learners who are able to apply what they have learned have also mastered the material to the extent that they can recall the material and understand it.

Bloom's Taxonomy has been revised (see Figure 6) to help educators better understand and evaluate learning outcomes when instruction is well planned has clear learning objectives (Anderson & Krathwohl, 2001). As applied to program evaluation design the model helps to classify and clarify the learning process so as to improve the evaluation design. That is, Bloom's Taxonomy provides a foundation for developing questions specifically to assess learning outcomes. Key words represent each hierarchical level of learning and may help in to assess learning outcomes and impacts of educational activities.

1. Remember what is learned: Recall, recognize, and identify
2. Understand or comprehend what is learned: Compare, explain, summarize, and paraphrase
3. Apply what is learned in a given situation: Use, carry out, and implement
4. Analyze what is learned: Organize, deconstruct, differentiate, and distinguish
5. Evaluate what is learned based on a set of standards: Check, critique, and judge
6. Create or put elements together to form something new: Generate, plan, and produce

Figure 6. Revised Version of Bloom's Taxonomy of Learning



A critical component of evaluation design is developing and writing the evaluation questions. In writing questions to evaluate short, intermediate and long term impacts, it is helpful to review similar criteria that Dillman (2000) provides for developing survey questions. These include:

- Write each question so as to require an answer from participants. Avoid questions with introductory words such as if and when, which invites nonparticipation or non-response.
- Encourage participants to relate their answer in terms of the present time. That is, structure the question in the context of what usually happens rather than what happened in the past. Participants can more readily estimate their current, usual activity rather than try to recall the past.
- Understand the extent to which participants may have ready-made answers. In attempting to measure attitudes and beliefs, for example, give careful consideration into sequencing of question items and wording of questions. Testing and rewriting question items is the best method for reducing the opportunity for inconsistent responses.
- The range of response categories provided influences responses. The visual appearance and layout of the choice set stimulates response as well. If the question and it response categories are vague, the more likely the risk for measurement error.
- To encourage participation, design a simply, clearly worded questionnaire that is friendly in appearance and invites responses. Avoid lengthy instructions and lists of questions to evaluate educational activities with clear learning objectives.
- Collect comparable evaluative data. That is, if participants are asked to complete evaluation questionnaires and provide feedback through focus groups, the questions featured in both approaches should be designed to produce data that are comparable.

Question structure is as equally important as question content. Three structures that are commonly used for this purpose include open-ended questions, close-ended as ordered response categories, and close-ended as unordered response categories.

Open-ended questions are very useful in soliciting feedback and input from participants or to probe for additional detail. Answers to open-ended questions can help to build future evaluation questions. This type of question structure is also helpful when restricting answers to a range of responses is impractical.

Examples include:

- How can fire science information benefit wildfire control?
- How can fire scientists improve communication with fire science users?

Close-ended questions with ordered responses provide participants with a categorical response scale where they must select one answer from a fixed range of choices. Examples include:

Example question #1: All citizens have a responsibility to prevent wildfire (please select only one answer):

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Example question #2: How effective are you in applying current fire science in your daily work? (please select only one answer):

- ☐ I need a lot of improvement at this
- ☐ I need some improvement at this
- ☐ I am okay at this
- ☐ I am good at this
- ☐ I am very good at this

Close-ended questions with unordered responses present possible answers in no particular order. Participants choose the response that best describes their situation. An example includes:

Example question #3: Whose responsibility is it to see that fire scientists conduct research that is useful to fire managers? (please select only one answer):

- ☐ Fire scientists
- ☐ Fire managers or users of fire science
- ☐ Agencies that fund fire science research
- ☐ General public
- ☐ Elected community decision makers

An example of a partially close-ended question with unordered response categories includes the following:

Example question #4: How do you prefer to receive fire science information? (please select only one answer):

- ☐ JFSP Consortia website
- ☐ JFSP Consortia ongoing demonstration sites
- ☐ JFSP Consortia one-day trainings
- ☐ JFSP Consortia printed self-paced materials
- ☐ Other (please describe) _____

In considering the structures presented, the easiest questions to answer are those that provide limited choices and thus require limited effort to consider and select an answer. However, certain circumstances merit the use of those questions that require more effort to consider and select an answer. For example, question #4 requires more time to consider responses plus possibly volunteer an additional choice the participant perceives as missing from the choice set.

Careful choice of words is a key to success in writing all structures of questions. Dillman (2000) provides principles to serve as guides when writing questions. These include:

- Choose simple rather than specialized words or phrases. For example, instead of using the word *occupation*, use *job*; instead of *respond*, use *answer*.
- Choose as few words as possible and avoid repetitious phrases. Instead of repeating the choices in each question stem, ask the question and provide the choices once.
- Use complete sentences to ask questions. Instead of *number of years worked in fire management*, use *how many years have you worked in fire management*?
- Avoid vague quantifiers such as *occasionally*. Instead provide a range of specific choices such as *once per month* and *two to three times per month*.
- Avoid specificity that exceeds the participant's capacity to answer the question accurately. For example, instead of asking how many fire science fact sheets have your read during the past six months, provide a set of numeric choices including 0, 1-2, 3-5 and so forth.
- Use equal numbers of positive and negative categories for scalar questions. For each level of agreement, for example, provide equal numbers of levels of disagreement.
- Distinguish "don't know" from neutral by positioning at the end of the choice scale. For example, on a choice scale of 1 to 5, "don't know" should be placed at the end of the scale as choice 6.
- Eliminate check-all-that-apply question formats to reduce primacy effects. In other words, participants are likely to select those items listed first than those listed last. Revise these questions to include a choice set.

It is a good practice to draft questions for content and then test these drafts on colleagues and staff. After revising questions accordingly, test the readability and clarity of the questionnaire further with a small sample of participants who can provide honest feedback. Typically, numerous drafts, revisions, and rewrites are necessary to produce a set of questions that satisfy the goal of content and readability.

For evaluations that are administered as printed and online questionnaires, format of individual questions and question sets is also an important detail to manage. Figure 7 illustrates a format that lists both questions and answers horizontally thus conserving space. The question stem is positioned directly above a list of simple stem endings. This format provides simply worded questions and conserves space, thus shortening the overall questionnaire length.

Figure 7. Main Question Stem Stated Once with Multiple Endings Listed.

As a result of attending trainings at the JFSP Consortia demonstration site, I:	Strongly Disagree	Disagree	Neither Disagree or Agree	Agree	Strongly Agree
Remember what I learn.	1	2	3	4	5
Apply what I learn right away at work.	1	2	3	4	5
Can explain to others about what I learned.	1	2	3	4	5
Have new ideas to share with fire science researchers.	1	2	3	4	5

Appendix A includes a copy of the questionnaire that is currently being used to help evaluate JFSP Consortia progress toward their goals at the aggregate level, along with a narrative describing the development of this instrument and the purpose of specific items. Though individual consortium

evaluations likely will be highly variable, this narrative may be useful in illustrating how questionnaires may be designed and question items developed to assess program outcomes.

Appendix B includes evaluation templates that provide helpful starting points in designing questions and strategies specifically for use in evaluating the impacts of educational activities as well as formative evaluation of the program as it evolves over time. While these templates only provide an example of question items, they may be used to jumpstart the development of the evaluation design and question writing process.

Resources to Assist with Evaluation Design

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Topic 4: Evaluation Methods

This topic area involves understanding and selecting methods for collecting and analyzing evaluative data. Evaluative methodology is most commonly categorized as quantitative and qualitative.

Qualitative methods generally are implemented in the natural setting where program instruction takes place. The researcher or evaluator becomes the instrument for collecting data and generally uses multiple methods for gathering data. These include interviews and observation of participants in addition to participants' observations. The data collected emphasizes descriptions of the participants' experiences and seeks to derive meaning from the perception of the participants.

Qualitative methods focus on the social interaction that occurs among program instructors and participants throughout the duration of the program and program activities, rather than strictly focusing on the extent to which targeted program outcomes are achieved. The researcher or evaluator applies an inductive approach to analyzing evaluative data. In other words, the meaning of the data collected is extracted from a larger body of information that comprises the data set.

Examples of qualitative methods pertaining to the JFSP program include numerous focus groups conducted by various planning consortia to identify fire science delivery needs. Another example includes the planned interviews of JFSP Consortia investigators; one component of the aggregate external evaluation of the JFSP Consortia program. The interviews will be conducted during the second year of JFSP Consortia program implementation. The purpose of the interviews is to learn about investigator challenges and opportunities concerning the development, implementation, and evaluation of JFSP Consortia. These qualitative data may help to determine *best practices* for JFSP Consortia investigators and yield information to support ongoing program improvements.

Quantitative methods generally are aligned with the natural science research model, which traditional emphasizes experimental designs to test specific hypotheses. These methods emphasize collecting numerical data that can be analyzed using statistical tests. Quantitative methods focus on objectivity and instrument reliability in the collection of evaluative data. It also seeks to replicate measurement and generalize findings to a broader population.

Surveys are the most common quantitative method used in program evaluation. Such surveys are comprised of Likert-type questions that produce numerical data. For the aggregate external evaluation of JFSP Consortia, for example, an e-survey is used which features primarily Likert-type questions producing scalar data or ordinal variables (See Appendix A). Similarly, the aggregate external evaluation of JFSP Consortia websites produces numerical or quantitative data.

Quantitative and qualitative methods each feature unique benefits and shortcomings. Unfortunately, the history of program evaluation includes a controversial period where evaluators struggled to determine the relevance and utility of each method, often promoting one method over another. This conflict resulted in evaluators becoming polarized in their selection of methods and resulted in a rift that persisted for decades. However, contemporary evaluations seek to be comprehensive and often employ a variety of quantitative and qualitative methods to provide a more holistic understanding of the linkages among program inputs, outputs, outcomes and impacts.

A comprehensive evaluation seeks to select and combine quantitative and qualitative methods consistent with evaluation goals, and illustrates linkages between methods, specific evaluation questions, and analyses. The resources provided in this section are designed to help JFSP Consortia investigators to:

- Select and implement evaluation methods appropriate for the evaluation goals.
- Apply appropriate methods to specific evaluation questions.
- Anticipate the inferential statistics to be used to analyze evaluative data collected.

Resources to Assist with Selecting Evaluation Methods

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Topic 5: Collecting and Handling Data

Before implementing an evaluation, JFSP Consortia investigators must consider and plan for the collection and management of quantitative and qualitative data. This topic area focuses on procedures for the collection, storage and processing of data and proper data collection and handling procedures.

In order to foster a research environment that advocates for the rights and welfare of individuals participating in research, Institutional Review Boards (IRBs) have been created to review research protocols involving human subjects.[3] Each institution engaged in research which is covered by Code of Federal Regulations, Title 45 (Public Welfare Department of Health and Human Services), Part 46 (Protection of Human Subjects) and, which is conducted or supported by a federal department or agency must provide written assurance of compliance with this policy.

The purpose of an IRB review is to evaluate the risk and the researchers' protection against risk for human subjects. IRBs exist to: 1) determine and certify that research protocols involving human subjects conform to the regulations and policies set forth by the US Department of Health and Human Services and the Food and Drug Administration concerning the safety, rights, welfare, health, and privileges of human subjects; and 2) assist and support investigators in their compliance with existing Federal and State regulations.

It is recommended that JFSP Consortia investigators and staff become familiar with their respective university IRB protocols and procedures in order to independently design and implement a data collection plan consistent with their evaluation objectives. [4] This typically requires appropriately described data collection methods and procedures within the context of an evaluation report.

Developing an application for IRB approval to conduct evaluative research requires the researcher to:

- Prepare IRB application forms according to required specifications.
- Apply knowledge of data collection methods to the creation of a simple data collection tool.
- Use technology to assist in data collection and management.
- Critique existing data collection tools on the basis of their reliability and validity.
- Apply the proper procedures for handling and managing data using a real data set.
- Report methods sections for evaluation reports and/or articles.

Files of evaluation data are created prior to data analysis. Therefore, it is important to consider, plan and provide assurances of data anonymity and confidentiality. Security concerns must be addressed with or without IRB approval. Plan should include where data are maintained and filed. Data resulting from evaluation of educational activities ideally should be kept in locked cabinets or secure locations. An approved IRB protocol includes a commitment to timelines associated with how long investigators maintain secure data as well as how data are to be destroyed.

If the resulting data are not intended for use in making generalizations about a population and/or provide little to no risk or harm to the human subjects involved, it may be possible that IRB approval is either exempt or unnecessary. This may be the case for the evaluation of Consortia educational

[3] IRBs are regulated by each institution's Office for Human Research Protections (OHRP) and were developed in direct response to human subject research abuses earlier in the twentieth century.
[4] In working with federally recognized American Indian tribes on sovereign reservation lands, individual IRBs often exist unique to a particular tribal government. It is necessary to seek tribal IRB exemption/approval prior to conducting survey research involving tribal members and reservation residents. This approval is in addition to and separate from university IRB approval.

activities. However, it is recommended that investigators pursue IRB approval for exemption and/or formal determination of whether or not IRB approval is needed.

The national aggregate evaluation of JFSP Consortia qualifies as a cooperative research project, according to the Code of Federal Regulations, Title 45, Part 46.114 (Cooperative Research). Cooperative research involves investigators representing multiple institutions. While each institution is responsible for safeguarding the rights and welfare of human subjects and for complying with the federal policy, an institution participating in a cooperative project may enter into a joint IRB arrangement. In this case cooperating investigators rely upon the review of another qualified IRB to avoid duplication of effort. Therefore, for example, while the aggregate evaluative e-survey is implemented by JFSP Consortia investigators, one IRB approval from the external evaluators' lead institution is sufficient.

The following resources can help JFSP Consortia investigators to plan for the collection and management of evaluative data. These resources may also help investigators to plan evaluation activities based on the amount of time needed for the IRB application and approval processes.

Resources to Assist with Data Collection and Management

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Topic 6: Analyzing and Interpreting Data

JFSP Consortia investigators may vary in their experience with evaluative data analysis and interpretation. Although presumably many understand and frequently use advanced statistics, others have had limited opportunities to practice statistical and analytical procedures in *applied* data analysis. Thus, this topic area covers basic analysis procedures available for both quantitative and qualitative evaluative data.

Descriptive statistics commonly are used to *describe* the features of the data collected for evaluation purposes; the goal being to describe the impact of the educational activity or outreach program. Descriptive statistics summarize and provide basic information about the individuals evaluated and the evaluation measures. Combined with a simple graphical analysis, they comprise the foundation of quantitative analysis of evaluative or applied data. Certainly, other statistical tests may be used in order to more rigorously study evaluative data to discern if causal effects are present or to generalize to a larger population. However, for the purpose of understanding evaluative data, descriptive statistics are sufficient.

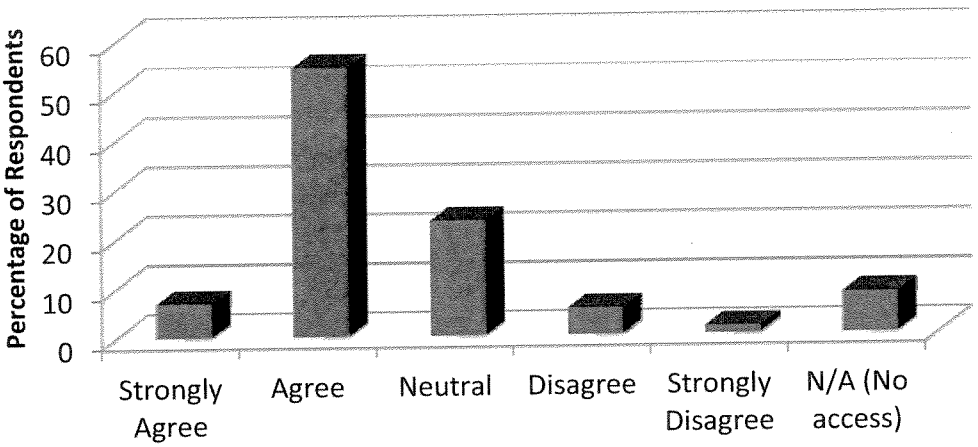
The procedures for analyzing and interpreting evaluation survey data depends on the type of data; qualitative or quantitative. It also depends on the number of questions in the evaluation instrument. Many evaluations of educational activities use primarily closed-ended questions with a fixed choice set of scalar or categorical response options (see Topic 3). These types of questions produce quantitative data.

The analysis of quantitative data such as these would begin with a description of the distribution of responses among the scalar categories. Using a statistical software package, such as Statistical Analysis System (SAS) or Statistical Package for Social Sciences (SPSS), a frequency table of counts and percentages is calculated. The information from frequency tables may be illustrated graphically for the purpose of sharing the results with program participants, program team members, funding sources and others (see Table 8).

Table 8. JFSP Consortia Consumers' Perceptions of the Currency of Web-based Communication: Frequency and Number of Responses

Question: The information I have received from web-based sources is current and up-to date						
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A
%	1.5	5.4	23.4	54.5	6.9	8.2
N	11	40	72	400	51	60

Figure 1. Consumers' Perceptions of the Currency of Web-based Communication Sources



The fire science information I have received from web-based sources is current and up-to-date

Analysis and interpretation of evaluation data becomes increasingly complex with a large number of question items. While frequency tables might be informative, the challenge with a large number of question items is to organize the results in order to be meaningful and useful. In order to interpret large sets of data, it is necessary to establish priorities. This is very applicable when the questions use the same response format. For example, a set of evaluation questions that ask participants to indicate their agreement with statements about what they have learned or which types of trainings are most effective, the question items may be rank-ordered by mean scores. Standard deviations and numbers of participants answering each question are also useful information to interpret mean scores. Alternatively, the items may be rank-ordered by percentage of participants who indicate they agree or strongly agree (see Table 9).

Table 9. Consumer Perceptions and Experiences Regarding Fire Science Information Accessibility and Applicability: Ranked Mean Responses

Question Item	Mean (SD)
Fire science information should be shared more frequently within my agency/organization*	4.05 (.74)
Using fire science information enhances my effectiveness on the job	4.03 (.68)
I trust fire science research findings	3.77 (.67)
I often draw on fire science research when making work-related decisions	3.63 (.83)
During the past year, I have changed at least one thing in my work based on what I've learned about fire science	3.39 (.93)
Fire science information is easy to find	3.37 (.83)
Fire science information is easy to understand	3.30 (.81)
Fire science information is easy to apply to my specific problems	3.13 (.87)

Source: JFSP Consortia Aggregate Evaluation Report, 2011.

Analyzing and organizing the data in this way provides a way to summarize and interpret the findings. For example, a rank ordering of skills featured in a given training (or series of trainings) can reveal those skills that participants learned most and learned least. This organization also allows similar types of items (in this example skills) to be compared.

To reduce data for the purpose of further analysis and interpretation, indexes and/or scales are useful tools. Both are composites produced by combining two or more question items. An index score is the sum of the scores of the choice categories for a group of question items.

In building an index, the items included should be shown to have face validity. That is the items should be shown to more or less measure what they were intended to measure. For example, several items that measure (post-program) behaviors of fire managers as part of an evaluation of programs that increase fire managers' skills should share a logical consistency. That is each item should in concept be relevant to skills essential to effective fire management practices.

Valid indexes are uni-dimensional. This means that the items in the index measure a single concept (dimension). In other words these items should be related to each other. Whether a concept is narrowly defined or broadly defined influences the extent to which a group of items featured in an index represents a single dimension. Bivariate and multivariate analysis are used to examine relationships among items of an index Bivariate relationships can be determined through tabular analysis. Two-way tables may be constructed and tested for relationships using chi-square, phi, and related statistics or correlations.

To assess the internal consistency of items included in an index, *Cronbach's alpha* statistic is often (Carmines and Zeller, 1979). An alpha score of .80 is to indicate acceptable internal consistency for an index.

Identifying these relationships for evaluation data can help identify program participants with unique needs. Similarly, identifying relationships between specific topics and the socio-demographic characteristics of respondents for an evaluation can help identify which segments of program participants achieved the greatest knowledge gains, attitude and behavioral changes, for example. This information can help to brainstorm new ideas for improving the program and increasing impacts.

The procedures for examining relationships between specific sets of question items (topics) and participant characteristics involves calculating two-way tables (cross-tabulations).The accompanying statistics (Chi-square and associated probability level) for each pair of items is the statistical test to determine if the relationship is statistically significant. By reviewing the Chi-square statistic and associated probability level for variables, it is simple to assess if relationships between variables meet the criteria for statistical significance. (typically .01 or a more rigorous .001).

Once these procedures are conducted, patterns among the items showing significant relationships can be identified. For example, if application of learned fire science is associated with years of experience as a fire manager but not gender or age, then efforts may need to be made to better understand the relationship between experience and knowledge application. Examining how job experience relates to the remaining question items that measure learning is warranted.

Qualitative data analysis includes comparing and contrasting statements to determine and interpret meaningful patterns or themes. Meaningfulness is determined by the particular goals and objectives of the evaluation. Qualitative data analysis focuses on words, phrases and statements. While analysis of these data lacks a set of universal standards, rules, and/or procedures, it can still be systematic and disciplined.

Qualitative analysis is distinguished by a reiterative pattern of examining the data to make connections, identify themes, and make` new connections. This process results in a deeper understanding of the data as themes emerge.

The goals for qualitative data analysis are to:

- Identify patterns and common themes in the context of specific question items.
- Consider how identified patterns inform larger questions.
- Determine if there are deviations from identified patterns and how to explain such deviations.
- Explain any interesting observations and how these inform the larger evaluation picture.
- Determine if the patterns identified suggest the collection of additional data or revision of the evaluation questions.
- Assess the extent to which the identified patterns support or do not support additional qualitative or quantitative analyses.

Evaluators who collect and analyze qualitative data are advised to involve at least two individuals. This helps to code data as objectively and freshly as possible. It is also advisable to begin data analysis as soon as possible following data collection.

For qualitative data collected from interviews of JFSP Consortia investigators, for example, transcription will be performed by one evaluation team member while a second team member verifies accuracy of the transcriptions. Once the transcripts are completed, data will be coded by two coders using Glaser and Strauss' (1967) constant comparative method with an emphasis on the respondents' natural language. This *grounded theory* approach to data analysis allows the evaluators to focus data collection while simultaneously induce emerging patterns. Multiple data coders working together to analyze and interpret the data also helps to reduce individual bias. Together, the evaluators will constantly modify initial coding and add to categories as necessary to sort the data and begin to arrange emerging themes.

The following resources can help JFSP Consortia investigators to select and conduct appropriate analytical procedures appropriate for program evaluation data. These resources may also help investigators to appropriately interpret findings and develop conclusions from an analysis of evaluative data to inform program improvement and change.

Resources to Assist with Evaluative Data Analysis and Interpretation

Berkowitz, S. (1996). Using qualitative and mixed method approaches. Chapter 4 in N*eeds assessment: A creative and practical guide for social scientists,* R. Reviere, S. Berkowitz, C.C. Carter, and C. Graves-Ferguson, Eds. Washington, DC: Taylor & Francis.

Betts, S. & Temper, K. (Eds). (2001). *Beyond basics: Evaluating community-based programs training curriculum.* Retrieved from http://ag.arizona.edu/sfcs/cyfernet/cyfar/Curriculum.pdf

Callor, S., Betts, S., Carter, R., Marczack, M., Peterson, D., & Richmond, L. (2000). *Community-based project evaluation guide.* Tucson, AZ: University of Arizona, Institute of Children, Youth, and Family. Retrieved from http://ag.arizona.edu/sfcs/cyfernet/cyfar/evalgde.htm

Fink, A. (2002). *How to manage, analyze, and interpret survey data* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2011). *Program evaluation: Alternative approaches and practical guidelines* (4th ed.). Boston, MA: Allyn & Bacon.

Glaser, B. G. (1965). The constant comparative method of qualitative analysis. *Social Problems, 12*(4), 436-445. Retrieved from http://www.jstor.org/stable/798843.

Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine.

Israel, Glenn D. 1992. *Phases of Data Analysis*. Program Evaluation and Organizational Development, IFAS, University of Florida. PEOD-1. October.

Israel, Glenn D. 1992. *Elaborating Program Impacts Through Data Analysis*. Program Evaluation and Organizational Development, IFAS, University of Florida. PEOD-3, September.

Kvale, S. (1995). The social construction of validity. *Qualitative Inquiry,* (1):19-40.

Miles, M. B., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Northcutt, N. & McCoy, D. (2004). *Interactive qualitative data analysis.* Thousand Oaks, CA: Sage Publications.

Ohio State Extension. (2008). *Successful assessment methods and measurement in evaluation (SAMMIE).* Retrieved from http://sammie.osu.edu/

Patton, M.Q. (1990). *Qualitative evaluation and research methods*, 2nd Ed. Newbury Park: CA, Sage Publications.

Preskill, H., & Russ-Eft, D. (2005). *Building evaluation capacity: 72 activities for teaching and training.* Thousand Oaks, CA: Sage Publications.

Salkind, N. (2007). *Statistics for people who think they hate statistics* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Silverman, D. (2001). *Interpreting qualitative data* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Strauss, A. L. (1987). *Qualitative analysis for social scientists.* New York: Cambridge University Press.

Taylor Fitz-Gibbon, C., & Lyons Morris, L. (1987). *How to analyze data.* Newbury Park, CA: Sage Publications.

Taylor-Powell, E., & Renner, M. (2003). *Analyzing qualitative data*. Madison, WI: University of Wisconsin-Extension. Retrieved from http://learningstore.uwex.edu/pdf/G3658-12.PDF

Wolcott, H. F. (2001) *Writing up qualitative data* (2nd Ed.). Thousand Oaks, CA: Sage Publications.

Trochim, M.K. (2006). *Research methods knowledge base: Descriptive statistics.* Retrieved from http://www.socialresearchmethods.net/kb/statdesc.htm and http://www.socialresearchmethods.net/kb/statcorr.php

University of Kentucky College of Agriculture. (n.d.). *Program development and evaluation resources.* Retrieved from http://www.ca.uky.edu/agpsd/soregion.htm

University of Wisconsin Extension Publication G3658-12 (n.d.). *Analyzing qualitative data.* Retrieved from: http://learningstore.uwex.edu/pdf/G3658-12.PDF

University of Wisconsin Extension Publication G3658-06 (n.d.). *Analyzing qualitative data.* Retrieved from: http://learningstore.uwex.edu/pdf/G3658-6.pdf

University of Wisconsin Extension. Publication G3658-14 (n.d.). *Using Excel for analyzing survey questionnaires.* Retrieved from http://learningstore.uwex.edu/pdf/G3658-14.pdf

Wholey, J. S., Hatry, H. P., & Newcomer, K. E. (2004). *Handbook of practical program evaluation* (2nd ed.). San Francisco: Jossey-Bass.

Wolcott, H. F. (2001) *Writing up qualitative data* (2nd ed.). Thousand O1aks, CA: Sage Publications.

Topic 7: Communicating Evaluation Results

Evaluation results must be effectively shared in order to ensure future program support and success. This requires that evaluation results be translated into forms of communication that are useful to various stakeholders. This includes evaluation reports that are easy to read and understand. Elements of communicating evaluation results include understanding the purposes of reporting, the content of a standard evaluation report, how to identify stakeholders, and how to present the results that matter most to stakeholder groups.

An evaluation report should include the following basic elements:

- **Introduction**: The Introduction section indentifies and frames the issue. This is the outline for the evaluation activity and states the goals for the evaluation with relevance to the program plan and model. Previous evaluation findings may be briefly referenced to help focus the relevance of the evaluation conducted and reported.
- **Purpose Statement**: The purpose statement outlines the selection of evaluative methods. It explains why quantitative, qualitative, and/or mixed methods are appropriate for the evaluation activity.
- **Methods**: This section explains the question(s) the evaluation activities seek to answer. In the case of evaluation activities associated with a logic model approach, for example, a methods section explains and provides specific examples of short and intermediate impacts. These include knowledge gains as well as attitude and behavioral changes the educational activities are designed to produce. Projections of anticipated long term impacts should also be described, tying logically into the intended short and intermediate impacts. The methods section explains why and how the evaluation questions were developed, review processes, and additional efforts to refine the instrumentation to collect evaluative data. The protocol for data collection is also described in this section.
- **Results**: This results section reports the findings of the evaluation activities. This section describes the data analyses and rationale for the analyses. This section highlights the types of descriptive statistics, for example, used to analyze the data, such as ranked mean scores, standard deviation, and analysis of variance. Analysis of the data to assess reliability of the instrumentation and validity of the results are also reported here.
- **Summary and Implications:** This section of the report succinctly reviews the evaluation activities, summarizing the purpose, methods and results. Implications are discussed for program improvement, given the findings of the evaluation activities. This section highlights what worked and what did not work in terms of the educational activities designed to produce the targeted program impacts. In both formative and summative evaluation scenarios, this information can be very useful to JFSP Consortia investigators, program participants, and the primary and secondary sources of program funding. When used constructively the summary and implications section can aid in targeting specific program improvements as well as refine future programming initiatives.

Tables 1 and 2 provide examples of how findings of the data analyses may be reported and highlighted in the results section of the report. In these particular examples, Likert-type questions were used to assess the extent to which hypothetical JFSP Consortia trainings may be effective in achieving intended impacts. These questions were designed to collect quantitative measures of participants' perceptions of their learning experiences.

Mean scores for each of the indicators are reported. In Table 2, pre- and post-test scores are illustrated as well as the results of paired t-tests. This information demonstrates the extent to which changes in knowledge and attitudes occurs using data collected from participants before and after the training. Statistically significant changes are noted.

Table 1. *Hypothetical* JFSP Consortia Training: Teaching Impacts Summaries

JFSP Consortia Trainings	Quality of Training	Usefulness of Training	Knowledge Gains as a Result of Training	Number of Participants
Fall Training	4.12	3.94	4.03	90
Winter Training	4.73	3.75	3.85	55
Spring Training	4.10	4.67	4.05	15
Summer Training	4.31	4.15	3.98	42

Rating code: 5 = highest; 1 = lowest

Table 2. *Hypothetical* JFSP Consortia Training: Sample Indicators of Short and Intermediate Impacts

Short-term/Intermediate-Term Impacts	Pre-test	Post-test	Number of Participants
I understand the fire science available to me	2.76	3.55[a]	101
I use the fire science available to me to do my job better	2.76	3.15[a]	101
I get my best fire science from fire scientists in my Consortium	2.77	3.04[a]	102
I will use my Consortium website to find the most current fire science information	2.30	3.65[a]	103

Rating Code: 1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = consistently

[a] Differences between pre-test and post-test scores statistically significant at $p > .01$.

Resources to Assist with Communicating Evaluation Results

American Psychological Association (2010). *Publication manual of the American psychological association* (6th ed.). Washington, DC: Author.

University of Arizona (n.d.) *Beyond basics: Evaluating community-based programs.* Retrieved from http://ag.arizona.edu/sfcs/cyfernet/cyfar/Curriculum.pdf

Callor, S., Betts, S., Carter, R., Marczack, M., Peterson, D., & Richmond, L. (2000). *Community-based project evaluation guide.* Tucson, AZ: University of Arizona, Institute of Children, Youth, and Family. Retrieved from http://ag.arizona.edu/sfcs/cyfernet/cyfar/evalgde.htm

Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2011). *Program evaluation: Alternative approaches and practical guidelines* (4th ed.). Boston, MA: Allyn & Bacon.

Ohio State Extension. (2008). *Successful assessment methods and measurement in evaluation (SAMMIE).* Retrieved from http://sammie.osu.edu/

Purdue University Writing Lab. (n.d.). *Writing your research project report.* Retrieved from: http://owl.english.purdue.edu/handouts/WAC/CDFS/powerpoint/researchprojectreport.ppt#256

Torres, R. T., Preskill, H., Piontek, M. E. (2005). *Evaluation strategies for communicating and reporting* (2nd ed.). Thousand Oaks, CA: Sage Publications.

University of Kentucky, College of Agriculture (n.d.). *Program development and evaluation resources.* Retrieved from http://www.ca.uky.edu/agpsd/soregion.htm

Topic 8: Evaluation Ethics

Every evaluation involves sociopolitical elements. Regardless of the approach, design, methodology, or depth and scope of any evaluation, it necessarily addresses issues relating to the allocation of resources and power. Because the results of evaluations often influence policy making and funding decisions, this inherent political nature of evaluation has spawned the evolution of ethics and standards.

Joint Committee on Standards for Educational Evaluation

Evaluation ethics refers to the principles of right and wrong action relating to rules of conduct to guide individuals in evaluation activities. The Joint Committee on Standards for Educational Evaluation (2011) provides 30 standards categorized into four groups which correspond to the four attributes determined in earlier work by the Joint Committee (1981) to comprise the attributes of ethical and sound evaluations. These attributes have been endorsed by the American National Standards Institute and as such provide national standards for ethical evaluation behaviors. These attributes and associated standards exist to ensure that evaluations of educational programs:

- Are *Useful* in that the evaluation is timely, informative, and influential.
- Are *Feasible* in that the evaluation is practical, realistic, diplomatic, and cost-effective.
- *Ensure propriety* in that the evaluation is properly and legally conducted with due regard for the welfare of those involved in and affected by the evaluation.
- *Ensure accuracy* in that they are comprehensive, measure what they are designed to measure, produce sound information, are technically adequate, and judgments rendered can be linked logically to evaluative data collected.

American Evaluation Association Principles to Guide Evaluators

Similarly, the American Evaluation Association promotes ethical evaluations and has developed a set of principles to guide evaluators. These include:

- *Systematic inquiry that is of the highest quality* in terms of technical standards, appropriate methods, strengths, and weaknesses of evaluation approaches and questions;
- *Competent* evaluators and evaluation teams that possess skills and experience necessary and also practice within the boundaries of their competence levels;
- *Integrity and honesty* of evaluators in their efforts to ensure integrity of the evaluation as demonstrated through honest admissions of conflict of interest, accurately present data, and findings and resolve concerns related to evaluation procedures and findings.
- *Respect for people* as demonstrated through the effort to develop a comprehensive understanding of the evaluation context, follow professional ethics and standards, optimize benefits and minimize risks or harm to participants involved, and perform the evaluation so as to demonstrate respect for participants' self-worth; and
- *Responsibilities for the diversity* of the general and public welfare, allowing stakeholders to access evaluative information and present findings in understandable way, honoring promises of the individual's confidentiality and consider the good of society (American Evaluation Association, 2011).

Evaluation is Never Context-Free

Simons (2006) maintains that any set of principles guiding the ethics of evaluation cannot be context-free. That is, evaluation occurs in a field rather than a laboratory. And, the sociopolitical nature of evaluation ensures that dilemmas will arise.

When it comes to evaluating outreach educational programs, community stakeholders decide if a program is a success. Evaluation data helps with this assessment, but ultimately it is stakeholders who decide what *success* is, if the program should continue, and interpret what the evaluation means to stakeholders and the broader community.

Thus, the reality of fieldwork provides ample opportunities that challenge evaluators to resolve ethical dilemmas. An ethical evaluator strives to investigate and report program quality and value for the purpose of informing, using understandable means, relevant program stakeholders in order to improve programs and/or increasing evaluation capacity.

As approaches to evaluating JFSP Consortia program and educational activities may increasingly engage the program participants, ethical issues will arise pertaining to utilizing only those evaluators who have participated in the Consortia program. In other words, program participants may not fully trust an "outsider" and not completely answer evaluation questions for fear of a breach in confidentiality.

Ethics, as they apply to evaluation principles and actions, is about how we should behave as members of society with a personal morality. It has to do with right and wrong actions on a daily basis. For example, in planning an evaluation, the evaluator must determine how the resulting information will be distributed and to whom it will be distributed. This is to help encourage that the code of "respect for persons" prevents the evaluator from misusing evaluation information, withholding from participants the purpose of the evaluation research, or asking individuals to participate without their knowledge.

Resources Concerning Evaluation Ethics

American Evaluation Association. (2011). American Evaluation Association guiding principles for evaluators. *American Journal of Evaluation*. 32(2): 165-167.

Joint Committee on Standards for Educational Evaluation. (2011). *The program evaluation standards: How to assess evaluations of educational programs* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Joint Committee on Standards for Educational Evaluation. (1981). *Standards for evaluations of educational programs, projects, and materials.* New York: McGraw-Hill.

Newman, D. L., & Brown, R. D. (1996). *Applied ethics for program evaluation*. Thousand Oaks, CA: Sage Publications.

Simons, H. (2006). Ethics in evaluation. In I.F. Shaw, J.C. Greene & M.M. Mark (Eds.), *Handbook of evaluation: Policies, programs and practices*. Thousand Oaks, CA: Sage Publications.

Smith, M. & Robinson, G. (2001). *Researching violently divided societies: Ethical and methodological issues*. New York: United Nations University Press.

Yarbrough, D. B., Shulha, L. M., Hopson, R. K., & Caruthers, F. A. (2010). *The Program Evaluation Standards: A guide for evaluators and evaluation users* (3rd ed.). Thousand Oaks, California: Sage Publications.

Web-based General Program Evaluation Resources Relevant to all Topic Areas

The following links provide useful guidelines for evaluating community-based programs.

General Guides to Program Evaluation

A Guide to Family Intervention and Prevention Program Evaluation
This step-by-step guide provides a basic overview to planning and implementing a youth program evaluation, with a slight focus on family violence prevention and intervention programs.

2002 National Science Foundation User-Friendly Handbook To Program Evaluation
This handbook provides a lengthy, but user-friendly guide to evaluating programs, from early design to qualitative and quantitative analysis with a special focus on creating culturally responsive evaluations.

Administration on Children, Youth, and Families (ACYF) Program Managers' Guide to Evaluation Research
This nine-chapter handbook is an easy-to-use guide through all steps in evaluation research, with a special focus on youth program evaluation. The guide provides step-by-step instructions through design, implementation, analysis, and data reports.

Ways to Improve the Quality of Your Program Evaluations
This guide provides simple tips for improving program evaluation.

Basic guide toward planning and implementing
This guide outlines an evaluation process for for-profit or nonprofit programs and provides additional ideas for planning an evaluation.

Collaborative Evaluation Led by Local Educators: A Practical, Print- and Web-Based Guide.
http://www.neirtec.org/products/evaluation_guide/neirtec_evalguide.pdf.
This online guide provides a simple outline for conducting a collaborative evaluation process.

Design and Implementation

Cost Analysis in Evaluation Research
This website provides an overview of how to conduct an adequate cost analysis prior to conducting evaluation research.

Alternative Methods for Collecting Evaluation Data
This website provides some useful guidelines for implementing alternative evaluation data strategies. Topics include: focus groups, cost analysis, portfolio assessment, qualitative interviews, and existing records.

Quick Tips for Evaluation Research
This website by the University of Wisconsin-Extension group provides some quick tips for evaluation research from planning, collecting, and analyzing data. The guide concludes with a discussion on how to effectively communicate and evaluate your data.

Using Logic models

This University of Wisconsin-Extension website provides helpful information for creating and implementing logic models in evaluation research.

The logic model for program planning and evaluation
This short paper by Paul McCawley (University of Idaho) provides an excellent and simple introduction to logic modeling.

Introducing program teams to logic models: Facilitating the learning process
This resource provides the outline and content for a half-day logic model workshop for managers, staff, and volunteers.

Enhancing Program Performance with Logic models
This is a comprehensive interactive web resource to learn about and improve use of logic models.

Using Surveys in a Community
This website provides a general overview for designing, distributing, and using questionnaire data.

Communicating with Your IRB
This guide provides some useful tips on how to communicate program goals to IRB panels through all stages of program evaluation.

Three self-study web modules
These modules are designed to improve evaluation practice: Module 1: Focusing your evaluation, Module 2: End-of-session evaluations and Module 3: Using evaluation data.

Introduction to Program Evaluation
This site features various types of program evaluation, steps pf evaluation, methods for gathering data, and data collection techniques.

The Penn State Cooperative Extension Program Evaluation
This website provides information to design and implement a useful program evaluation in order to improve a program, compare delivery methods and respond to stakeholders.

Communicating Your Findings

Beyond the Data
This is an interactive website that provides a basic guide for how best to communicate evaluation research findings in a meaningful way.

More Resources on Program Evaluation

The American Evaluation Association is an international professional association of evaluators devoted to the application and exploration of program evaluation, personnel evaluation, technology, and many other forms of evaluation.

The Evaluators' Institute offers short term professional development courses for practicing evaluators.

International Organization for Cooperation in Evaluation *helps* legitimate evaluation and support evaluation societies, associations, and networks so that they can better contribute to good governance, effective decision making, and strengthen the role of civil society.

The National Legislative Program Evaluation Society offers a wealth of learning and professional development opportunities for program evaluators, whether new or experienced. Includes links to state offices of program evaluation and/or performance auditing in the USA.

Online Handbooks and Textbooks for Evaluation Research
Publisher: American Evaluation Association
Description: This website includes a host of general and program-specific online textbooks and evaluation research handbooks.

Evaluation Design and Methods
Publisher: CYFERnet
Description: This website includes guides and articles related to conducting program evaluations.

Appendix A

JSFP Consortia National Evaluation: Development and Purpose

The following narrative briefly describes the processes involved in the development of the JFSP Consortia national evaluation instrument, highlighting the purposes of specific question items and linking these items to the measurement of desired JFSP Consortia programming outcomes. The evaluation instrument described comprises one component of the overarching JFSP Consortia evaluation effort, and is currently being used to measure Consortia progress toward their shared goals. As JFSP Consortia are diverse and have specific goals linked to their educational and outreach activities, their individual evaluation protocols will substantially differ from one another and from this example design. We hope that this narrative may be useful, however, in illustrating how an evaluation tool is developed to target the desired results of an educational program.

Evaluation Instrument Development

All JFSP Consortia are working toward the overarching goal of improving fire science delivery by increasing the accessibility and applicability of fire science information. This may be accomplished through several means, such as improving relationships between fire practitioners and scientists; increasing collaboration among fire science professionals (both practitioners and scientists) and organizations; providing more interactive learning opportunities for fire practitioners; synthesizing and clarifying current fire science research results; and developing JFSP Consortia websites offering a variety of fire science information and resources relevant to local problems and conditions.

The JFSP national evaluation instrument targets these shared goals, as well as the effectiveness of common strategies Consortia have proposed to facilitate progress toward these goals. JFSP Consortia necessarily are unique, however, with respect to their geography, ecology, demography, and political boundaries. Variations also exist among JFSP Consortia in terms of existing collaborative fire science projects, as well as in communication styles and strength of relationships among research teams, stakeholders/users, and fire scientists and practitioners.

More refined goals among individual JFSP Consortia also may differ. Some Consortia, for example, strive to increase the accessibility and applicability of fire science information to the general public, whereas others are primarily focused on educating fire managers/practitioners. Due to these differences, the JFSP national evaluation instrument was designed to yield an aggregate evaluation of Consortia activities, rather than a comparative assessment of individual consortium performance.

Phase one of the national evaluation has been administered during the first year of Consortia funding. A similar version of the evaluation instrument (slightly modified based on initial results and current Consortia activities) will be distributed to Consortia participants during the second year of funding. Results from the first wave of evaluation questionnaire distribution may illuminate initial successes and potential gaps in Consortia programming, as well as participants' fire science information needs. In turn, this information may then be used to help ensure the quality and relevance of Consortia activities. Results from the second wave will further track Consortia progress toward shared goals at the aggregate level and provide information regarding the effectiveness of Consortia strategies in yielding desired outcomes.

Those involved in program development and management often best understand their program evaluation needs, so their perspectives are critical to effective evaluation design. Thus, the national evaluation instrument (online questionnaire) was developed through a collaborative process involving the JFSP evaluation team, Consortia PIs and Coordinators, and other key JFSP personnel.

Multiple versions of the questionnaire were drafted and circulated for review. A series of revisions were made based upon ongoing Consortia feedback and recommendations. The final version of the questionnaire represents an integration of input from each consortium.

Purpose of National Evaluation Question Items

All evaluation question items were developed to target JFSP Consortia program objectives within the context of the logic model. The national evaluation primarily focused on short-term and medium-term outcomes, as many long-long term outcomes of JFSP Consortia outputs may not emerge for several years.

A draft of the questionnaire was developed using a collaborative approach involving eight JFSP Consortia (first Consortia to receive funding 2010). Evaluators developed question items based upon Consortia objectives and outreach activities as described in proposals to the JFSP Board. Drafts of the questionnaire were circulated among Consortia investigators and JFSP Board members for review. Revisions to question items and design were made accordingly.

The resulting questionnaire was pre-tested by subsets of the targeted survey population. That is, the questionnaire was pre-tested by a panel of four Consortia investigators and two JFSP Board members. These individuals were later omitted from the study sample. The purpose of the pre-test was to identify missing items, evaluate content validity, and to check for clarity and comprehension of question items. The questionnaire underwent final revisions based upon the pre-test results.

The national evaluation questionnaire features "three frames". These frames or versions of the questionnaire specifically target:

1) Fire managers and/or fire science practitioners;
2) Fire researchers and/or scientists; and
3) Land owners and/or community members.

As the fire manager/practitioner questionnaire is the most extensive and widely distributed, this discussion focuses on the purpose of items included in this frame or version. Please refer to the copy of the Manager/Practitioner questionnaire as needed throughout the remainder of this section.

Section 1: Experiences with Fire Science Information (p. 1, Items 1 -15)

This section was designed to yield information regarding participants' current perceptions of the accessibility and applicability of fire science information, as well as any changes or improvements in these perceptions occurring between the two waves of survey distribution. Further, it explores whether improvements in the accessibility and applicability of fire science information translate into behaviors (e.g., whether current tools and research results are being used on the job). As previously mentioned, fire science delivery may be enhanced through several means, some of which are the focus of items in this section (e.g., enhancing relationships between practitioners and scientists).

Items 1-3 (Fire science information is easy to find, Fire science information is easy to understand, Fire science information is easy to apply to my specific problems) measures *attitudes* and *beliefs* about the general accessibility and applicability of fire science information. Within the logic model framework, these items target short-term programming outcomes. Item 10 (Fire science information should be shared more frequently within my agency/organization) also measures beliefs about the accessibility of fire science information while tapping organizational behaviors/practices.

Fostering positive relationships between fire managers/practitioners and fire researchers/scientists may be critical in improving the applicability and accessibility of fire science research results and tools. Not only are such relationships conducive to information sharing, but research conducted by fire scientists must be relevant to practitioners needs in order to be applied. In turn, the use of such research results depends on fire practitioners' trust in such research findings and their willingness to apply them to local problems. Accordingly, several items aim to assess the quality of relationships between fire managers/practitioners and fire researchers/scientists. These include items 6 and 7 (I have worked jointly with fire science researchers/scientists on research projects; I would like to work/continue working with jointly with fire science researchers/scientists on research projects), which measure medium-term outcomes evidenced by behaviors and behavioral intentions. Items 4-5 (Fire science researchers/scientists value my knowledge and experience as a field professional; Fire science researchers/scientists rarely provide information that helps me address the management problems I face) and 11-13 (Fire science researchers are reluctant to study problems by local managers/practitioners; Fire science researchers/scientists are easy to approach; Fire science researchers/scientists are willing to directly work with me…) assess beliefs and opinions about fire scientists and their behaviors (short-term outcomes which may potentially be linked to medium-term outcomes such as behaviors). Item 8 (I trust fire science research findings) also targets beliefs and opinions and thus assesses a short-term outcome related both to fire science research itself and those who produce it.

Item 9 (Using fire science information enhances my effectiveness on the job) targets perceptions of job performance, a medium-term outcome of JFSP Consortia programming. Items 14-15 (I often draw upon fire science research when making work-related decisions; …I have changed at least one thing in my work based upon what I have learned about fire science) specifically target behavioral (medium-term) outcomes. That is, these items go beyond an assessment of whether participants believe that fire science information *is applicable*, and aim to determine whether such information is *actually being applied* in the field.

Section 2: Fire Science Activities (p. 2, Items 1 – 5)

Educational activities (outputs within the context of the logic model) proposed by the JFSP Consortia vary according to their target audience and their needs as indicated by baseline assessments. Consistent with an aggregate evaluation, this section is designed to measure outcomes of Consortia activities *in general*, inquiring as to whether participants believe some of these desired outcomes have been realized. These items primarily measure participants' perceptions of medium term outcomes, such as changes in policy (Item 1), organizational effectiveness (Item 2), and collaborative behaviors that should increase the accessibility and applicability of fire science information (Items 3 – 4). Item 5 (I would recommend Consortia involvement to my co-workers) measures behavioral intentions, also a medium-term outcome in the logic model framework.

Section 3: Experiences with Consortium (bottom of p. 2, Items 1 - 5)

As JFSP Consortia are in different stages of development, not all participants were aware of their regional Consortia and its purpose at the time of the first wave of survey distribution. Section 3 is similar to Section 2, but was designed for individuals familiar with their regional consortium to provide a more targeted assessment of perceptions of Consortia contributions to mainly medium-term outcomes. Again, items reflect common goals across Consortia, such as improving the accessibility and application of fire science information (Items 1- 2), local fire management policy (Item 3), and communication among fire managers/practitioners and fire researchers/scientists. Opinions/beliefs about the value of Consortium involvement (a short-term outcome) are measured in Item 5 ("I would recommend Consortium involvement to my co-workers").

Section 4: Website (p. 3, Items 1 – 6)

Each consortium has invested significant resources into developing and maintaining individual websites aimed at enhancing fire science delivery. Thus, it is important to determine whether these outputs cohere with Consortia objectives and if they are meeting users' needs. Many Consortia shared similar visions in proposing their websites- for instance, developing a site that was easy to navigate and well-organized, providing "one-stop shopping" sites, including interactive website components to facilitate communication between practitioners and scientists. As the Consortia websites have recently been launched, Items 1 – 5 in this section probe participants' opinions about common indicators of website quality and utility (i.e., whether participants believe that their consortium's site is user-friendly, provides a wide variety of fire science information, provides practical information that they can use on the job, provides up-to-date information, and organizes information in one convenient place). Item 6 directly asks participants whether their consortium provides a forum for communicating with other practitioners or scientists.

Section 5: Communication Sources (p. 4, Items 1 – 11)

Preferences for varying sources of fire science information were explored in several of the JFSP Consortia baseline assessments. This section gathers additional data about such preferences, specifically targeting frequency of use (actions/behaviors; a medium-term outcome) and the perceived usefulness of fire science information obtained from each communication source (beliefs/opinions; a short-term outcome). Responses will be used to help track improvements in the accessibility, quality, and relevance of fire science information as a result of Consortia outputs. In addition, responses may help Consortia investigators focus their efforts on developing and providing communication sources or learning opportunities that participants find most useful.

Section 6: Obstacles (p. 5, Items 1 – 5)

Most of the items throughout the online survey are positively framed and target strengths of JFSP Consortia outputs. This section, however, focuses on identifying potential gaps in Consortia programming that may inhibit goal progress. Items reflect some of the common obstacles to accessing fire science information as mentioned in Consortia proposals to the JFSP board: limited opportunities to communicate with researchers/scientists (Item 1); poor synthesis and organization of existing fire science information (Items 2 – 3); and lack of communication within and between organizations (Items 4 – 5). Responses may again help Consortia focus their efforts and resources on minimizing perceived obstacles, and/or on implementing alternative means of narrowing programming gaps. Despite their focus on obstacles, items in this section also can be used to assess improvements as increased levels of disagreement with each item signify that these gaps no longer exist and/or are being effectively addressed.

Current Status of National Evaluation

JFSP Consortia vary with regards to stages of development and disbursement of funding needed to establish their individual websites and implement planned outreach and educational activities. Because of these differences, each Consortium launched the national evaluation at a time deemed most appropriate, resulting in a staggered administration of the evaluation instrument (i.e., between February 2011 and May 2011). Presently, data from respondents across all Consortia have been collected, analyzed and reported.

The national evaluation will be re-administered in 2012 to assess changes and improvements resulting from Consortia educational activities. Again, results will not be used to compare Consortia, but will be analyzed at the aggregate level to assess the comprehensive progress of JFSP Consortia toward reaching documented goals. Individual evaluative activities of JFSP Consortia will differ depending on the scope and intent of such activities. However, items included in this national evaluation may be used or adapted by any consortium to the extent that it meets individual evaluation needs.

Appendix B

Program Evaluation Resources: Evaluation Templates

The following templates provide examples of questions and formats that may be useful to JFSP Consortia investigators in evaluating educational activities. These templates include examples of instruments and questions to collect quantitative data and include post- and post-reflective tests. Examples of open-ended questions also are provided to collect qualitative evaluation data.

Post-tests are administered to participants after they complete an educational activity. They often gauge participants' evaluation of the activity instructor (e.g., whether they were helpful, informative, engaging) and of the activity itself (e.g., participants' ratings of the quality of various aspects of the learning activity). The most useful post-tests typically target a range of participants' perceptions related to knowledge, attitudes, and beliefs, or behavioral intentions or actual behaviors. Ultimately, post-test items should reflect the desired outcomes of the educational activity (output) within the context of the logic model.

Post-reflective tests also are administered upon completion of an educational activity; however, they assess participants' knowledge and/or attitudes and behaviors both prior to and following their participation in the activity. Data from post-reflective tests can be particularly useful in assessing both comprehensive and specific impacts of an educational activity. Additional information regarding post-reflective tests, their rationale, and their drawbacks and benefits can be accessed through the following websites:

http://www.uwex.edu/ces/pdande/resources/pdf/Tipsheet27.pdf

http://www.uwex.edu/ces/pdande/resources/pdf/Tipsheet29.pdf

http://extension.psu.edu/evaluation/pdf/TS30.pdf

Examples of different types of post-reflective items and their purpose can be accessed at:

http://www.uwex.edu/ces/pdande/resources/pdf/Tipsheet28.pdf

TEMPLATE #1: Simple post-test evaluation of educational activity

Template #1 illustrates *potential examples* of Likert type scale questions for collecting quantitative data to measure changes in knowledge, attitude, and possibly behavior, as a result of JFSP Consortia educational activities. JFSP Investigators may develop additional questions or replace the example questions provided. The data collected may be used to calculate either percentages or mean scores reporting the participants' perceived general effects of the educational activity. It should be noted that the following items are merely placeholders, and should be replaced with statements representing the learning objectives of each consortium's particular educational activity.

Evaluation Instructions: Please take a few moments to complete the following evaluation of the [insert NAME OF CONSORTIUM educational activity]. Please indicate, on a scale of 1 to 5, with 1 being "strongly disagree" and 5 being "strongly agree", your agreement with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I learned something that I can use in my job immediately.	1	2	3	4	5
2. I met new Consortia participants with whom I plan to stay in touch.	1	2	3	4	5
3. I plan to contact a fire scientist with research ideas I have that could help me in my work.	1	2	3	4	5
4. I think differently about fire science as a result of this educational activity.	1	2	3	4	5
1. I learned something interesting to me that will help me in my professional development.	1	2	3	4	5
2. The educational materials I received today are easy to understand.	1	2	3	4	5
3. My consortium is having a long-term impact on how science is used and applied in fire management decisions.	1	2	3	4	5

TEMPLATE #2: Post-reflective evaluation of educational activity

Template #2 illustrates potential examples of Likert type scale questions for collecting quantitative data to assess overall evaluations of JSFP Consortia educational activities as well as participants' changes in knowledge as a result of these activities. This template may be best-suited for a relatively brief activity (e.g. a workshop or training spanning several hours to one day) as it primarily targets changes in knowledge/understanding (short-term outcomes within the logic model framework), while including a brief assessment of anticipated behavioral change. Means or frequencies may be calculated for Items 1 (A-E), 6, and 8 to measure general evaluations of trainings/workshops. Data regarding changes in knowledge are collected through the use of a post-reflective test format to provide baseline and impact scores for each measure (Item 2). Training topics listed are only examples and should be replaced with the primary objectives of your specific training/workshop; additional items may be added depending on the goals and scope of the educational activity. These data may then be used to conduct paired t-tests to determine if participants' perceived knowledge changed as a result of the educational activity.

Frequencies may be calculated for Item 7 to yield a general assessment of participants' intentions to apply the knowledge they have gained from this specific educational activity. Open-ended questions provide participants with the opportunity to explain why the educational activity was or was not applicable to their work. Additional information regarding analysis of post-reflective data may be accessed via the following websites:

http://www.uwex.edu/ces/pdande/resources/pdf/Tipsheet29.pdf

http://extension.psu.edu/evaluation/pdf/TS52.pdf

Insert Name of Training Here

Evaluation

Please take a few moments to think about today's training and give us your answers to the following questions. Please do not place your name on this evaluation. The information you provide will help us to plan and improve future trainings.

1. **Please provide the following overall evaluation on the effectiveness of this training on a 1 to 5 scale (1 = not effective, 5 = very effective).**

	Not Effective				Very Effective
A. Organization and preparation	1	2	3	4	5
B. Style and delivery	1	2	3	4	5
C. Responsiveness to participants	1	2	3	4	5
D. Creating a learning environment	1	2	3	4	5
E. Content of the training	1	2	3	4	5

2. Please rate your knowledge of the following topics *before* attending today's training and *after* attending today's training using a 1-5 scale (1 = poor, 5 = excellent).

	Knowledge *before* attending today's training					Knowledge *after* attending today's training				
	Poor				Excellent	Poor				Excellent
Fuels treatment practices	1	2	3	4	5	1	2	3	4	5
Prescribed fire planning/implementation	1	2	3	4	5	1	2	3	4	5
Ecosystem management strategies	1	2	3	4	5	1	2	3	4	5
Climate impacts on fire regimes	1	2	3	4	5	1	2	3	4	5
Monitoring burn severity	1	2	3	4	5	1	2	3	4	5
Fire mapping methods	1	2	3	4	5	1	2	3	4	5

3. What did you like least about today's training?

_____

_____

4. What did you like best about today's training?

_____

_____

5. How much did this training provide you with resources to meet your fire science information needs (1= Very Little, 5=Very Much)?

1----------2----------3----------4----------5
Very Little **Very Much**

6. Approximately how many co-workers or staff do you plan to share the information you received in this training? _____

7. Do you plan to *make changes or take actions* in your work based on this training (please mark one)? Yes_____ No_____ Not sure_____

If "Yes" could you briefly explain?

If "No" or "Not sure," which best describes why?

_____Information not applicable or relevant to my work

_____ Need more information or training

_____ Other: Please explain briefly

_____ The information is interesting but cannot be directly applied in my work

8. Overall, how *valuable* to you or your organization is the information provided by today's training (1= Not Very Valuable, 5=Very Valuable)?

1----------2----------3----------4----------5
Not Very Valuable **Very Valuable**

TEMPLATE #3: Post-reflective evaluation of educational activity

This template may be adapted to evaluate more extensive/lengthier educational activities, as it includes post-reflective items assessing changes in attitudes, opinions, and behavioral intentions in addition to those targeting basic learning objectives of the activity. The first section assesses changes is understanding (knowledge) of the primary objectives of the educational activity- a short term outcome within the context of the logic model. The first three items in the second section assess changes in attitudes and beliefs as a result of the learning activity, whereas the last three items target changes in behavioral intentions. Though these also represent short-term outcomes within the logic model framework, behavioral intentions are highly predictive of actual behaviors and changes in decision-making, which are both medium-term outcomes. Again, changes in participants' perceptions as a result of the learning activity can be assessed by calculating mean scores and conducting paired t-tests for each before and after item.

It should also be noted that this template can be adapted for the purposes of administering an actual pre-post test. In this case, participants would complete two identical questionnaires; one administered prior to participation in the educational activity, and one administered following participation in the educational activity. With respect to the following template, the "before" and "after" columns would be eliminated; they would simply be asked to report their understanding and opinions regarding training topics once before the activity and once again after they have completed the activity. Again, in deciding whether to utilize a simple post-test, post-reflective test, or actual pre-post test to evaluate their activities, Consortia investigators are encouraged to review their respective benefits and shortcomings (resources are highlighted at the beginning of this Appendix).

INSTRUCTIONS: Please take a few moments to complete the following evaluation of the NAME OF CONSORTUIM [educational activity]. On a scale of 1 to 5, with 1 being "very little" and 5 being "very much," please indicate your level of understanding of the following topics both *before* you participated in this educational activity and *after* you participated in this educational activity.

	Understanding *before* participating in activity					**Understanding *after* participating in activity**				
	Very Little				**Very Much**	**Very Little**				**Very Much**
1. New and improved sources of fire science information	1	2	3	4	5	1	2	3	4	5
2. New and improved methods for applying fire science research results and tools	1	2	3	4	5	1	2	3	4	5
3. Ways to connect with fire researchers/scientists in my region	1	2	3	4	5	1	2	3	4	5
4. Options/strategies to help address local problems/issues	1	2	3	4	5	1	2	3	4	5
5. Implications of fire science policy in my region	1	2	3	4	5	1	2	3	4	5

NEXT, please select the response that best indicates your viewpoint **1)** Back *before* you participated in this educational activity and **2)** Now *after* you have participated in this educational activity on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

	Back *before* the activity					**Now *after* the activity**				
	Strongly Disagree				**Strongly Agree**	**Strongly Disagree**				**Strongly Agree**
1. Fire science research findings are trustworthy	1	2	3	4	5	1	2	3	4	5
2. Current fire science research results and tools are relevant to my needs	1	2	3	4	5	1	2	3	4	5
3. It is important to establish relationships with fire researchers/scientists	1	2	3	4	5	1	2	3	4	5
4. I anticipate collaborating on projects with local researchers/scientists	1	2	3	4	5	1	2	3	4	5
5. I plan to utilize current research results and tools to enhance my job performance	1	2	3	4	5	1	2	3	4	5
6. Recognize and act upon opportunities to share fire science information within my organization	1	2	3	4	5	1	2	3	4	5

Please answer the following questions:

1. What did you **like most** about this [educational activity]?

_____

_____

2. What did you **like least** about this [educational activity]?

_____

_____

3. What would you have **changed** about this [educational activity]?

_____

_____

Please provide any additional comments about this [educational activity]

_____

_____

Thank you for your time and cooperation in completing this evaluation.