

# Developing a Science Integration Strategy for JFSP



Final Report to the Joint Fire Science Program

JFSP Project # 06-S-02

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## **Introduction**

The mission of the Joint Fire Science Program (JFSP) is to produce high quality research findings to inform wildland fire and fuel managers' decisions. Since its inception in 1998, the program has funded nearly 400 studies and has generated a tremendous amount of information and analytical tools. As the JFSP moves into the future, a Science Delivery Strategy is needed to: 1) ensure that this base of information finds application, and 2) create a more systematic way to identify and organize new work that will encourage its rapid assimilation by the management community. The attached Science Delivery Strategy was developed in conjunction with the JFSP Program Office Staff and has been approved by the JFSP Governing Board. In addition to Jamie Barbour (PI), the drafting committee included Rachel White (Science Writer) and David Seesholtz (Science Liaison), both with the USDA Forest Service, Pacific Northwest Research Station's Focused Science Delivery Program, and Tim Swedberg (JFSP Communication Director). Several past and current JFSP Governing Board members also participated in developing the strategy. The contents of this report document the process used to develop the strategy and factors we considered. We concentrated on describing a focused systematic strategy that is fully integrated with the entire research and development process rather than added on, ad hoc, after the fact. We also built in flexibility so that the JFSP can incorporate feedback from its customers as new approaches are tested. In this way, we can help the JFSP stay relevant to its customers by continually assessing whether new approaches work and what remains to be learned.

## **Project overview**

We worked through a broad network of contacts within the fire management, resource management, research, and marketing communities to ensure that a wide range of perspectives and points of view were considered both in the problem framing stage and as the strategy was drafted. The scoping process took place in late calendar year 2005 and the initial draft was delivered to the Governing Board in February 2006. The review and revision process continued until September 2007 when a combined Science Delivery Strategy and Implementation Plan was accepted by the Governing Board (Appendix I).

**Problem framing**—We began by doing a thorough assessment of the strengths and weaknesses of the science delivery processes currently used by the JFSP. This included informal discussions with about 50 key JFSP supporters and customers such as agency administrators and their staffs; resource specialists at all levels within federal, state, and local organizations; practitioners; researchers; and contractors. We also talked to individuals not associated with the JFSP but who were familiar with other applied research organizations. We used these discussions to gather input from people who have a stake in JFSP research, to learn their opinions of what kinds of science integration activities work or do not work. We want to be clear that this was not a systematic or formally structured process. It was a series of informal discussions held with people who were potential customers, partners, or contractors of JFSP, and others knowledgeable about science delivery processes. The results we report should, therefore, be treated as impressions rather than hard facts. Information from this problem-framing phase was crucial for understanding why a new approach to science delivery is needed, and to develop criteria that would allow us to measure our success as we design a new process.

Some of these discussions were conducted by Jamie Barbour (PI) and some were conducted by Tim Swedberg. All centered on three topics:

- 1) Awareness—Was the individual familiar with the JFSP? If so did they have specific knowledge of JFSP products? If so had they or someone they knew actually applied one or more of these products in their work?
- 2) Relevance—Had the JFSP been working on the right types of problems?
- 3) Future Needs—Regardless of whether they were aware of the JFSP, what sorts of things did the individual think the program should work on in the future to make it more relevant to them and their agency?

We also evaluated the science delivery methods used by other applied science organizations, such as international forestry research organizations that had been privatized during the 1970s and 1980s, or other US government laboratories like the

Naval Research Station and the National Renewable Energy Laboratory. We looked for common features in how these organizations behaved. We also tried to understand the things they had attempted that had failed. Although we learned many useful things from this process, we felt that we barely scratched the surface of the potential cumulative understanding of the ways an applied research organization can accelerate the adoption of the information and tools it develops.

**Drafting a strategy**—Our goal was to develop a framework for science delivery and knowledge adoption that builds dialogue with practitioners and encourages continued support from sponsors. From the information we gathered in the problem-framing phase, we knew that the strength of our strategy would come from understanding client needs, using those needs to raise expectations of what we could deliver, and then delivering on those expectations. The most successful science delivery processes we identified were ones that were integrated with the problem framing stage and then carried on through the dissemination stage. Without this continuity, it is difficult or impossible to develop products that are truly useful to practitioners. Therefore, client participation and feedback is a key part of the strategy. Client participation is sought and incorporated at several stages. We outline these stages as: 1) problem framing, the identification of practitioner needs for new or better information and tools; 2) prioritization, the selection of topics for study; 3) knowledge discovery, the generation of new information or creation of new tools; and 4) dissemination, managing the diffusion of either tools or information to those who need them.

We also include scientists in this process. Scientists bring a different perspective to the problem framing process than practitioners and we value this perspective. They can also benefit from participating in a process where they are not in control of decisions about what topics are selected for study, because they gain understanding of the management context and information needs of the JFSP's clients. By involving a variety of views in these stages, we also hope to develop synergy for interdisciplinary solutions.

## **Deliverables**

- A catalog of strengths and weaknesses of the existing system

- A concise description of why changes in the existing science delivery system are needed.
- A proposed set of criteria with which to judge success of a new science delivery strategy.
- A draft science integration strategy
- Recommendations for implementation of the strategy

## **Catalog of strengths and weaknesses of the existing system**

The combination of informal discussions and evaluation of science delivery methods used by other applied research organization revealed several ways that the JFSP could improve its science delivery efforts. It also revealed several strong points that probably should not be changed. This list was compiled in late calendar 2005 before the first draft of the Science Delivery Strategy was presented to the JFSP Governing Board for consideration. Since then the program has invested considerable effort in raising awareness and streamlining the delivery of products so these observations are intended to provide a historical context for how the strategy was developed. They are not intended as a catalog of the current situation.

### **Strengths**

1. **High quality science.** The quality of the science resulting from JFSP funded work is high. In a companion study, 05-S-07, “Accelerating Adoption of Fire Science and Related Research: A concept to organize our delivery of new ideas,” we found that almost all of the JFSP funded studies resulted in science products that address the issues the studies were funded to investigate. This record speaks to the scientific credibility of JFSP supported work.
2. **Widely recognized in the science community.** The JFSP is widely recognized by the natural resources research community throughout the United States. Of those we talked with, all of the researchers and research administrators from government laboratories, universities, and private research firms knew about, and most had interacted with, the JFSP. For the most part they had a positive impression of the program and would like to see it continue operation. There were criticisms of the

program but these mostly dealt with scope of the funded work, quality or fairness of the review process, and distribution of funding rather than the way information generated by the program is disseminated and brought into practice.

3. **Represents agency interests.** Of the agency personnel who were aware of the JFSP, the consensus was that the current governing structure is effective in representing agency needs. Interestingly, some people from each of the agencies felt that the distribution of funding favored other agencies' needs over their own.
4. **Board members are committed to improving use of JFSP generated science.** We held one or more discussions with each of the JFSP Governing Board members. As a whole, the Governing Board was interested in improving awareness and use of the research sponsored by JFSP. In fact, they are interested in improving the use of all fire-related research regardless of how it was funded.
5. **Support for fire science education.** The prohibition against using JFSP funding to support permanent employees at universities and government laboratories appears to have resulted in bringing new people with fresh ideas into the fire science community. It is also creating a cohort of young professionals who know how research is done and are beginning to be hired by JFP sponsoring agencies.
6. **Accessibility and responsiveness of program office staff.** For those who interact with the JFSP, mostly scientists and science administrators, there is general agreement that the program office staff is readily accessible either by phone or email, and that they are responsive to questions. The program office staff is seen as particularly helpful in explaining Announcements for Proposals, providing information about the types of studies that are most likely to receive funding, and sorting out issues regarding administration of existing studies.

### **Weaknesses**

1. **Not widely recognized by the management community.** The most striking thing we noticed in talking with potential customers for JFSP funded research was that most of them did not know about the program or were only vaguely familiar with it. This was true across the administrative hierarchy. One exception was agency personnel who were directly involved in formulating agency budgets who tended to

know of the JFSP but had limited awareness of its accomplishments. An interesting aspect of this finding was that many, perhaps most, of the people who did not know about the JFSP did know about major products that the JFSP had sponsored. For example products like the Fuels Photo Series, FFE, Farsite, and the Fire and Fire Surrogates Study were very well known but they were not identified with the JFSP. They were identified with the research unit where the work was being done.

2. **Attempts to include customers not effective.** The JFSP has made several attempts to gather input from sponsoring agencies, but by and large they have not had the desired results. The most notable example was the formation of a Science Advisory Committee. Formation of this committee was complicated by the Federal Advisory Committees Act (FACA), and once the committee was formed it did not meet regularly. By chance, we spoke to several members of the committee who felt that its governance was far too complicated and they could not see a positive benefit from their participation. We did not systematically contact all of the committee members, so this might not be a widely held opinion, but discussions with several past and current Governing Board members seemed to support the notion that this committee did not live up to expectations. Several years ago, the JFSP sponsored a series of three workshops intended to raise awareness of the program and help the Governing Board in setting the research agenda for the program. Unlike the Science Advisory Committee, people who had participated in these workshops seemed to have a positive impression of them but they did not know whether they had an influence on the research the JFSP had funded since the workshops. We did not ask about participation in review panels for JFSP proposals, so we do not know how people who participate in the panels view the JFSP.
3. **Governing Board members do not agree on who JFSP clients are.** When we held discussions with Governing Board members (late 2005), there was no clear consensus on who the JFSP customers were. The one consistent response was the customers were “managers”—meaning natural resource practitioners. Since those initial discussions, this situation seems to have improved markedly; but it is important for the Governing Board to continually revisit this question if an effective science delivery program is to be instituted and maintained.

4. **Current science delivery efforts are ad hoc in nature and unfocused.** The JFSP requires a technology transfer plan with each proposal, and this has helped to raise awareness among JFSP Principal Investigators about the importance the Governing Board places on moving information into use. The current process is not specific about what types of activities are acceptable, and seems to assume that all scientists are naturally talented in helping practitioners understand the utility of the innovations they produce. As a result, the most common activities PIs engage in are more suited to informing other scientists than practitioners. For example, presentations at scientific meetings or workshops and publication in traditional scientific outlets were the two most frequent methods we found that scientists had used in accomplishing their technology transfer requirement. Perhaps a more fundamental concern is that this system assumes that the results of a single study are useful in themselves, when in most cases a synthesis of findings from a number of studies is generally needed to address complex problems faced by practitioners. Finally, this system leaves it up to individual scientists to decide what to deliver and who to deliver it to. In effect, this means that people who are not involved in setting policy or direction for the JFSP are given a key role in demonstrating that the program is achieving its primary objective of making a difference in the way fire and fuels related management decisions are made.
5. **Funding work under umbrella themes is not an effective science delivery tactic.** The use of umbrella themes to solicit proposals results in a body of information that is fragmented, and makes it difficult for practitioners to connect the JFSP's accomplishments with the program. This is true regardless of the fact that most of the JFSP sponsored studies meet their objectives and deliver high quality science products.

### **Why changes in the existing science delivery system are needed?**

Our problem framing process revealed that awareness of the JFSP's past accomplishments was low on the part of both the head office and field staff for most of the JFSP sponsoring agencies. This observation matched with the perceptions of the

Governing Board members, which had led them to initiate this study. The process also told us that the head office and field staff were aware of some JFSP funded products, but they tended to identify them with the research unit where the work was done rather than JFSP. Accordingly, we devised a two part strategy to raise awareness and use of the JFSP's past accomplishments and to ensure that at least part of the JFSP's future portfolio is coordinated in a way that it addresses complex, high-priority problems encountered by substantial numbers of practitioners with a high probability of rapid adoption by field level practitioners.

### **Draft science integration strategy**

The strategy is organized around the following five main objectives:

- 1) **Periodically reevaluate our customer base to make sure we know who we are trying to reach.** Because issues and organizations continually evolve, we will periodically reevaluate our customer base to make sure our research is really connecting with users, and that we are developing the right tactics for communicating with each group.
- 2) **Work with our customers to develop an effective problem-framing process that identifies topics for science delivery and applications activities.** This step ensures that scientists can shape their products to meet the practitioners' needs, and that practitioners can stay engaged and motivated to adopt the resulting innovations.
- 3) **Periodically reevaluate our product line to make sure we have the right mix to meet diverse customer communication needs.** We want to make sure that as we focus on developing useful science, we don't go astray of our customers' needs and expectations. Therefore, we will regularly evaluate our information products, determine if they are effective, and if necessary consider new ways to reach our audiences.
- 4) **Explore ways that scientists and managers with different skills, backgrounds, and personalities can effectively contribute to the science application process.** Rather than relying solely on PIs to decide what technology transfer methods to use and who to transfer their innovations to, we will identify people with interests

and skills in science delivery and capitalize on their talents for reaching audiences.

- 5) Deliver our product line to our customers.** Produce a variety of informational materials that are easily accessible, and that fill a variety of needs. We feel it is important to differentiate between “ad hoc” science delivery methods where the investigator manages delivery through their personal network of technical contacts, and “corporate” science delivery where the organization decides on the topics, target audiences, and delivery methods based on strategic priorities.

For a full version of the combined Science Delivery Strategy and Implementation Plan see Appendix I.

## **Recommendations**

**CAPITALIZE ON EXISTING ACCOMPLISHMENTS.** The practice of funding a series of uncoordinated studies under an umbrella theme created good and needed science, but results are difficult to use because each study provides only a small piece of the puzzle. **Syntheses:** We suggested that the JFSP develop a set of written products that highlight, simplify, and synthesize results from individual studies and groups of related JFSP sponsored studies. **Road Shows:** We also suggested that the JFSP sponsor a series of tightly controlled workshops, known as Road Shows, which will teach selected groups of highly motivated practitioners about the innovations the JFSP has already developed. By working with these early adopters in a structured environment, we believe we can greatly accelerate the dissemination and adoption of new information developed by the JFSP and other fire science organizations. We know that the awareness problem is not unique to JFSP sponsored research, and by including work funded by other sources we can help practitioners access the full array of information that will help them to do their jobs more effectively.

**INVOLVE CUSTOMERS IN A VARIETY OF WAYS.** Find ways to include practitioners at all stages of the research cycle from problem framing to application of findings. Making the customers a part of the process increases the likelihood of

developing innovations that are suited to their needs. The JFSP already includes practitioners in the review process for funding proposals but their involvement does not carry through the entire research cycle. Finding a variety of ways solicit information on needs from the spectrum of JSFP Sponsoring Agencies and across their administrative hierarchies is important. Considerable progress has been made in this regard in the past year. At the other end of the research cycle the JFSP has begun commissioning independent Manager's Viewpoints that are written by and for managers. They assess whether a completed JFSP project is useful to practitioners on the ground. This can help in creating awareness of results among practitioners. It also helps scientists to understand how their work might be used by practitioners. Selected practitioners (termed clients in the strategy) can also be engaged in larger projects as technical advocates or champions to help build support, create awareness, and guide the design of products so they are well suited to practitioner needs.

**FOCUSED LINES OF RESEARCH.** Some problems are too complex to be handled by a single study or even a suite of related yet uncoordinated studies. These problems require a concerted effort through a program of work that may last for several years and involve many investigators. The Science Delivery Strategy included a provision to address these types of problems through Focused Lines or Work that are initiated and managed with close connection to a community of practice through a round table process. Under this process practitioners help to design and guide the work so that they are prepared to rapidly adopt resulting innovations. Deliberately linking a group of studies within a systematic framework in consultation with practitioners is a major departure from the way the JFSP has previously managed its work. This step was recommended specifically to address the need for more effective science delivery.

**BUILD ON EXISTING RELATIONSHIPS.** Look for ways to capitalize on the cohort of young professionals whose education was supported by JFSP funded research. These individuals are now being hired by JFSP sponsoring agencies and could provide an effective science delivery channel. Coming up with a way to help them identify closely

with the JFSP could help agency leaders understand why the JFSP is worth their investment.

**MANAGE EXPECTATIONS AND FOLLOW THROUGH.** Follow through on expectations once they are raised. The simple act of telling participants in problem framing activities what was heard and what the organization can realistically act on is often good enough. The practice the JFSP Program Office has instituted to send out “We Heard You” messages after formal discussions with client groups is a very good idea. The review process for Problem Framing Roundtables is another. By involving practitioners in the review process and keeping those who express an interest informed about the prioritization, selection, and progress of research, the JFSP can follow through on expectations, while also identifying a community of interested participants around specific information needs. This is a key step in establishing an effective science delivery channel.

**ENCOURAGE APPROPRIATE PARTICIPATION BY SCIENTISTS.** Scientists should get involved in the problem framing process and science delivery processes. This closes the distance between research producers and research users by broadening perspectives on both sides. Practitioners can learn about the constraints involved in the scientific process, while scientists get a chance to consider how their work could meet the needs of those in the field. Scientists should not be put in the position of filtering information provided by practitioners until needs are fully defined by the Program Office and the Governing Board has an opportunity to set priorities.

**THINK CAREFULLY ABOUT WHO THE JFSP IS FOR.** Continually reevaluate who the JFSP customers are, with the goal of achieving Governing Board and Sponsoring Agency consensus on this. It is critical to have a clear understanding of who the customer is in order to design an effective science delivery program, measure success and can be measured, lessons can be learned when science delivery fails to work, and innovative methods can be effectively designed.

## **Evaluating Success**

Evaluating when science delivery is effective or demonstrates an impact is always problematic, but in the process of drafting the Science Delivery Strategy we came up with several methods that the Governing Board might use. They revolve around the objectives of estimating awareness of the program and quantifying use of JFSP generated information. Tracking the change in the number of visits to the JFSP website is an easy and inexpensive way to get at the question of use. A more elaborate method is being tested as a separately funded study. A systematic sample of environmental (NEPA) documents written several JFSP Sponsoring Agencies is being examined to determine the number of JFSP sponsored reports and publications that are cited. If this technique is successful it could be expanded to other areas where tracking of information use is practical. A third way to measure success that has not been tested is for the Governing Board to reach consensus on the population of JFSP customers and regularly survey them to determine how aware they are of the program, its products, and which of those products they use.

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## **APPENDIX I**

# **Developing a Science Integration Strategy for JFSP**



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**Joint Fire Science Program**  
**Science Delivery and Application Strategy**  
**2007 through 2010**

**Why should there be a strategy for science delivery?**

The mission of the Joint Fire Science Program (JFSP) is to find solutions to the problems faced by managers of fire-prone forests and rangelands. In fulfilling this mission, the JFSP has generated a substantial volume of new knowledge, methods, and tools related to fire, fuels, and human interactions with them. There is, however, no organized system to bring our accomplishments into use.

A recent analysis of the past ten years of work showed that of the more than 300 studies commissioned by JFSP, almost all resulted in high-quality scientific publications or other outputs, such as workshops or websites. However, there is relatively little recognition among practitioners of the contribution the JFSP has made. In part, this is because the JFSP has devoted its time to creating relevant science rather than shepherding the application of its products. In addition, the JFSP has not established early connections with practitioners to identify management problems and information needs and then tailored new research to address the problem and make practitioners' jobs easier. Instead we have generally funded studies under umbrella topics that are of broad general interest, or we have supported other organizations' established lines of work. In the future we intend to address umbrella topics *and* pursue specific, practitioner-guided lines of work, because we recognize that each has utility in solving different types of problems. In both cases we also want to change the way we support adaptation of JFSP-sponsored innovations to help practitioners do their jobs. Our goals are to stay relevant to our customers, raise awareness of our products, and most importantly, to develop science that helps land managers meet their objectives.

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With these goals in mind, this strategy is designed to ensure that practitioners become aware of the innovations the JFSP generates, to provide users with simple yet effective ways to evaluate the utility of our innovations, and to assist them in adopting these innovations. As we achieve these goals, we will move from the current ad hoc method of science delivery and application to a more systematic process that adheres to four guiding principles:

1. The JFSP produces high quality scientific information.
2. The information we produce is relevant to one or more of our major client groups.
3. We begin new research efforts knowing how the information generated will be used and who will use it (excluding basic research).
4. We can only know what information is needed by engaging with our clients throughout the entire research cycle from problem framing through application. This continuous feedback helps us measure our performance and future funding decisions.

We believe that the most critical aspect of the research, development, and application process is to correctly frame the problem. This requires understanding the information needs of our customers within the context of their working environment. Accordingly, we will devote considerable effort to working with our customers to ensure that we understand their information needs and have correctly prioritized them before we begin new research. This way we will become more deliberate about linking our problem-framing activities to our science delivery and applications activities.

Scientists are an important part of this process because they do not face the same everyday pressures as practitioners and can sometimes look past these nagging issues to see their underlying causes. Additionally, by participating in the process, scientists can gain perspective on management issues within the context of the people who face them. Over time, we hope to develop a cadre of scientists who are truly sensitive to the problems practitioners face and enjoy working with practitioners to solve their most

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important and enduring problems. The JFSP will use this science delivery and applications strategy to manage a partnership between practitioners and scientists through which we can frame problems, develop programs of work to address them, and efficiently move information from discovery through development and into application quickly and effectively.

The Program also recognizes a need to push the frontiers of fire science research. One component of the Program is to fund basic research that may be in the form of concept papers or formulating study plans to address emerging issues.

### **Program performance**

The JFSP provides annual funding through a competitive peer-reviewed process to ensure the best proposals are supported. Since 1998, the Program has funded almost 400 fire science research, development, and application projects. Our process is responsive to managers' needs and can react to emerging management issues. Our goal is ambitious: to provide the wildland fire management community with "research that supports sound decisions."

We make the assumption that the Program is efficient because our competitive research proposal structure results in 96 percent of appropriated funding going directly to research institutions. Only 4 employees administer the \$14 million Program and provide science delivery support.

The science delivery strategy will help the Program evaluate delivery effectiveness. The fundamental criteria are the impact of the Program and the return on its investments. Ultimately, the goal is to be recognized by the wildland fire community as the "first-source" for credible fire science information. An additional outcome will be that our research findings are applied in the decision making processes of land management agencies.

## **The Science Delivery and Application Strategy**

This strategy describes the specific steps the Governing Board and Program Office will take to bring JFSP-sponsored tools and information into use by the fire and natural resource management communities. **The five strategic objectives of the Science**

### **Delivery and Application Strategy are:**

1. Periodically reevaluate our customer base to make sure we know who we are trying to reach.
2. Work with our customers to develop an effective problem-framing process that identifies topics for science delivery and applications activities.
3. Periodically reevaluate our product line to make sure we have the right mix to meet diverse customer needs.
4. Explore ways that scientists and managers with different skills, backgrounds, and personalities can effectively contribute to the science applications process.
5. Deliver our product line to our customers.

**Objective 1.** Periodically reevaluate our customer base to make sure we know who we are trying to reach.

In a broad sense, our customers include individuals, at all administrative levels, who are charged with finding ways to plan for and manage wildland fire and its impacts on human communities, ecosystems, and the environment. We can categorize our customers into the following five groups, each with distinct information needs.

1. We consider **land managers** the ultimate consumers of the JFSP's products. At all levels in government and private organizations, they are responsible for fighting wildfires and managing the ecosystems where wildfires occur. The largest group of land managers includes the GS-7 to GS-15 specialists and line officers who plan and implement activities associated with wildfire and natural resource management on federally-administered land, and their counterparts who manage state and private lands. These "practitioners" or "managers" want information and tools that are appropriate for

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their level of technical expertise and that will help them to do their jobs more easily or effectively.

2. Another customer group we think of as **clients**. Clients are individuals or groups who interact closely with the JFSP or its agents (e.g., study Principal Investigators). By representing different customer groups, clients help the JFSP to understand the specific needs of those groups. In other contexts these types of people are sometimes referred to as champions or earlier adopters.

3. **Partners** are groups or individuals who devote funding or other resources to accomplish work supported by the JFSP. Partners generally have specific agendas. When we work with them we must develop techniques to assure them that their needs are adequately addressed. Creative interactions with partners help us to accomplish more with our limited resources.

4. Federal, state, and private **policymakers** use information generated by the JFSP to inform the decisions they make about wildfires and related issues. Our interactions with policymakers are important because they can both influence the implementation of our products and advocate for us. We want to manage interactions with policymakers in ways that are mutually beneficial.

5. **Congress** sponsors the program by providing both its mandate and its funding. Members of Congress and their staffs need to know what the program has accomplished, that its products are being used, and that they are making a difference in the field. Members of the other four customer groups can help members of Congress and their staffs understand what JFSP has accomplished.

We can currently define our customers in these general terms, but it is also useful to take a closer look at the differences among the specific agencies and organizations represented by individual customers. Understanding the unique organizational

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structures, political cultures, and management mandates of the different natural resource agencies that make up our customer base will help us find the best way to tailor information to their various needs.

For example, as a general rule, more hierarchical organizations are able to implement innovations faster, while less hierarchical organizations are more innovative. We will use this to our advantage as we develop and deploy innovations. The agencies we serve typically mandate standard administrative procedures across their units with relative ease, yet individual units retain a certain level of autonomy when it comes to conducting environmental analyses or planning and implementing management activities. As we make decisions about what new information and technologies to develop we will work at higher levels within the agencies, but as we begin to test prototypes we will work with individuals or units, especially those we have identified as being creative. This will allow us to build unit-level support for innovations as we tailor them to the needs of an agency, and to take advantage of the important processes of reinvention and adaptation offered by interacting directly with practitioners.

Because issues and organizations continually evolve, we will need to periodically reevaluate our customer base to make sure our research is really connecting with the users we have in mind, and that we are developing the right tactics for communicating with each group.

**Over the next 2 to 3 years we will:**

1. Use education and training programs to identify who uses fire-related science, and if necessary, diversify our science delivery approach to reach new customers. We will build this step around four broad types of research, development, and application activities:
  - Syntheses of existing state-of-the-art knowledge
  - Conducting new research
  - Validating existing research through field trials

- Developing applications and analysis tools
2. Recognize differences in various agencies' cultures and hold JFSP Board-level discussions about how to interact with them. For example, to stay in keeping with tribal communication traditions, we will try to reach BIA customers through personal, one-on-one approaches, while reaching BLM customers will require recognition of their state-by-state organizational structure. The National Park Service needs alternatives that are compatible with the mandate to maintain as natural a setting as possible. The Fish and Wildlife Service has dual requirements for information geared toward consultation on one hand and active management of wildlife refuges on the other. Finally, the Forest Service is probably the most structured of the JFSP customer organizations, but there is a high level of local autonomy within the agency. JFSP is likely to find customers in several different branches of the Forest Service and several discipline areas within each branch, so it may have more in common with the other agencies than is immediately apparent.

**Objective 2** Work with our customers to develop an effective problem-framing process that identifies topics for science delivery and applications activities.

**Gathering customer input.** "Customer technical committees" are a proven technique to identify areas of common interest, establish customer contacts for studies, provide guidance, and participate in the delivery and application of products. Virtually every successful development and application organization uses some form of technical advisory committee. These committees create a sense of ownership on the part of customers, and provide a way for them to connect directly with the research organization. But we have learned that such groups need a narrow focus and specific tasks to be truly effective. However, to remain relevant to emerging issues, the JFSP must move from topic to topic over time. This means that establishing standing committees in specific topical areas could become an impediment to timeliness. With that in mind, we will establish transitory technical committees or "roundtables" when we

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have specific problem-framing tasks, such as identifying potential new lines of work, or gathering input on customer needs.

Roundtables are used to establish and guide Focused Lines of Work. The purpose of Focused Lines of Work is to create a connection between JFSP accomplishments and our customers more effectively than the umbrella topics have done in the past. The roundtable process will ensure that information is presented in ways customers find useful and will also help them feel as if the JFSP is responsive to their needs.

**Topical advocates manage major lines of work.** The JFSP has established a network of advisors who are technical experts on specific topics through our roundtable process. These specialists evaluate existing technology and advocate for new technologies that are needed for the work they do in fire management. On the JFSP Governing Board, each board member plays a similar role by representing a particular DOI agency or branch of the Forest Service. Each member provides input about the needs of the organization they represent. We will expand this model to include individuals who work closely with the Governing Board to provide information on specific programmatic areas, e.g., fire behavior modeling, the environmental effects of fire hazard reduction treatments, training programs, etc. The role of these “topical advocates” is to provide information to the Governing Board about needs, monitor progress, and evaluate effectiveness. We consult these advocates for both research and synthesis projects.

**Nurturing champions.** A similar technique is the use of formalized interactions with customers at the study level. Champions are clients who advocate for specific products and are both enthusiastic about a particular project or idea and effective in garnering support within their organization. We will nurture champions and attempt to associate one or more champions with every major study or group of smaller studies. They will play two roles: (1) they will inform us of how to best shape a study so that it is meaningful to the customer group they represent, and (2) they will help us market

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products from that study to our customers. In many ways this is an expansion of the Federal Cooperator role JFSP currently has for each project.

**Over the next 2 to 3 years we will:**

1. Turn customer information needs into Focused Lines of Work by establishing roundtables of practitioners to help us frame a problem, provide input on the research, and finally act as early adopters for the resulting innovations. The Program Office and Board conduct the first step by identifying high priority topics that warrant a major investment. This process is being tested using three such topics: biomass removals from fuel treatments, smoke and air quality management, and risk management. Once the set of studies constituting the Focused Line of Work is established, the roundtable format creates the opportunity to review accomplishments or interact with the scientists conducting studies. These interactions are designed so that the scientists can shape their products to meet the practitioners' needs, and so the practitioners can stay engaged and motivated to adopt the resulting innovations. Coordination of the various activities involved in these Focused Lines of Work is essential for maintaining a cohesive set of products that address practitioners' needs. Otherwise, practitioners would have to piece information together, making it unlikely that they would adopt our innovations. There might be a variety of ways to maintain coordination of work, one of which could be to appoint a project manager who would oversee the various activities. In fact, we have utilized the talents of a Project Manager in the JFSP Software Tools and Systems Study to achieve desired results within the project timeline. We will explore options to determine which method would work best for the JFSP.
2. Continue to seek high-level input from JFSP constituents. The Board, the JFSP Program Office, and the JFSP Principal Investigators (PIs) play important roles in this discussion. Each Board member and the Program Office staff have an obligation to continually ask constituents about the types of information they need and how they will use it. The Program Office will regularly confer with the Board about these contacts to discuss whether the JFSP is addressing the high priority problems that

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are sufficiently enduring to warrant investment. PIs have a different role as ambassadors for the JFSP. They have regular contact with managers and policy makers regarding the research the Board contracts with them to conduct. The Board encourages PIs to contact the Program Office with ideas about the needs of customer groups and how to reach groups that do not currently see themselves as JFSP customers.

**Objective 3.** Periodically reevaluate our product line to make sure we have the right mix to meet diverse customer needs.

To make sure we aren't getting so focused on the development of useful science that we go astray of our customers' needs and expectations, we will regularly evaluate our information products, determine if they are effective, and if necessary consider new ways to reach our audiences.

**Over the next 2 or 3 years we will:**

1. We will develop a monitoring process to evaluate whether our product line is reaching our customers and meeting their diverse needs. This could be as simple as an annual discussion among the Board members as to how successfully they think the products are being received. It could also involve structured statistical analyses, such as the study we are currently sponsoring to evaluate how frequently JFSP-funded work appears in NEPA documents.
2. We will work to generate awareness among our customers that we want to explore new ways to get information and tools to the ground and work with them to identify and test new approaches. We believe that by doing these things we can build momentum among our customer groups to think up and test new science delivery methods. This could be done through development of direct contractual relationships or indirectly through existing relationship such as the Park Service's contracts with Cooperative Ecosystem Study Units or the Forest Service Research Station's emerging formal relationship with the extension departments of the western forestry schools.

**Objective 4.** Explore ways that scientists and managers with different skills, backgrounds, and personalities can effectively contribute to the science applications process.

The Board recognizes that different people have different skills and interests. They learn differently, and in fact, the same person will sometimes look for the same information in different ways depending on the circumstances. Up until now, the Board has for the most part relied on PIs to decide what technology transfer methods to use and who to transfer their innovations to. We realize that this is an inefficient method because many scientists are either not interested in or not skilled at these types of activities. They tend to gravitate toward traditional methods such as publishing findings in research journals or other scientific outlets, making presentations at conferences, and participating in workshops or training sessions. These types of activities do not lead to rapid assimilation of new information by managers who already consider themselves overworked and might not really be motivated to learn new things or change old habits. In other situations PIs are excellent at science delivery and we should learn from them.

**Over the next 2 or 3 years we will:**

1. The Program Office will organize an internal network of study PIs and others to act as a think tank on science delivery for the JFSP. Several PIs have already demonstrated their talents in science delivery. Likewise a cadre of JFSP customers is emerging that is particularly interested and effective in bringing new tools and information into their organizations. These individuals have the potential to reach the status of clients (those who are especially good at helping the Board to understand a broader group of customers' needs) or partners (those who bring resources to bear in solving a problem) as described above in Objective 1. During the next two years the Board expects the Program Office to identify these PIs and customers and establish an informal network that allows them to provide input on and participate in science delivery activities sponsored by the JFSP.

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2. We will pilot a method for reaching opinion leaders and early adopters within our customer groups through a series of structured workshops known as **Road Shows**. *Road Shows* combine elements of a scientific workshop, a field trip, and a marketing focus group. They are a mechanism to bring together selected scientists and key customers in a relaxed atmosphere for a structured conversation about an area where the JFSP has accumulated a body of information. A *Road Show* is a major effort to kick-start the innovation diffusion process so that targeted customers with identified needs become aware of new information or tools in a controlled setting. Customers provide feedback on how to best package the “product” so that their peers will adopt it more quickly. Scientists learn how managers assimilate new information and what factors they consider as they decide whether or not to adopt a new innovation. The scientists who participate in a *Road Show* must be good conversationalists, quick thinkers, and not elitists. They need a demeanor that puts people at ease and radiates a sense that this person knows their craft. Managers selected to participate are known leaders in their specialties and agencies. They are people who others will follow when they begin to use a new tool or idea and they can provide constructive criticism about how to most effectively deliver the product. The basic format of a *Road Show* is a one- or two-day workshop with 3 to 5 scientists or other developers and 10 to 15 managers. The process is managed by a facilitator who is skilled at drawing information from a variety of personality types, recognizing and defusing budding conflicts, and keeping things interesting. The final participant is a science writer with knowledge of the topic. This person’s job is to record what was said and combine that with the available scientific literature or other relevant information, then to produce a document that captures the main points, questions, and answers that were raised during the event. The result is a brief but informative document that can be shared with technical specialists who have an interest in the innovation. In some cases the record from a *Road Show* could become an issue of *Fire Science Digest*, in others it might be one of a variety of Forest Service or USDOJ publications. The *Road Show* begins with the publication of a synthesis on a topic where the JFSP has made a major contribution. This is sent to the group of

managers who are invited to the *Road Show* with a request that they provide questions about the topic that are important to them. The planning team, which includes a representative from the Program Office, a facilitator, a representative from the customer group, a lead scientist, and the science writer, will use this information to plan the discussions. The actual event involves very brief (5-10 minute) presentations of key pieces of information either by scientists or managers, interspersed with sufficient time to discuss the information and promote a two-way flow of ideas on how the information could be used in the management context. A *Road Show* generally consists of several events located in different parts of the country, or if appropriate, hosted by different agencies.

### **Objective 5.** Deliver our product line.

Currently we have a range of printed and web-based information products that each serve different communication functions. These are as follows:

- **Manager's Viewpoints.** These are summaries of completed JFSP projects that are written by land managers, for land managers. Each one includes relevant findings from the study, a thorough discussion of management implications, a list of products the project generated, and information on where to find out more. These are significant in that they provide a manager's perspective on study findings. Currently available on the JFSP website.
- **Fire Science Digest.** This is a printed publication, with a maximum of 12 pages. It will come out 3 or 4 times a year, and will focus on a broad management issue, using pertinent findings from more than one JFSP study. Its purpose is to provide broad overviews on topics such as the fire-climate connection.
- **Fire Science Brief.** One of these will be written per completed JFSP project to highlight its findings. Written by science writers, it will be a maximum of 4 pages, and will be available on the JFSP website.

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- **Fire Science: First Look.** This 2-page web publication is designed to announce upcoming research. It acts as a preliminary outreach tool to garner interest and encourage discussion.

**Over the next 2 or 3 years we will:**

1. Continue to create a variety of attractive and readable documents that highlight JFSP accomplishments and provide technical users with information that will make it easier for them to do their jobs.
2. Make these products easily available. The JFSP website will be a cornerstone of this effort. To keep these products relevant and to keep the attention of our customers, we will be updating the website with current information and new products once a month.
3. Bring the "shopping cart" feature online.

This systematic strategy recognizes that JFSP innovations begin and end with a focus on our customers. The Program will continually seek independent assessments of our effectiveness, impact, and relevancy. We will learn and adapt to improve our results. The JFSP Governing Board will evaluate science delivery priorities and funding support based on demonstrated results during this 3-year pilot period.