



# Best Practices for Science Communication

## With the Northwest Fire Science Consortium

The Northwest Fire Science Consortium (NWFSC) works to accelerate the awareness, understanding, and adoption of wildland fire science. We connect managers, practitioners, scientists, and local communities and collaboratives working on fire issues on forest and range lands in Washington and Oregon.

To support the effective exchange of fire science, we strive to follow best practices for science communication. These guidelines are intended to support scientist presenters, field trip organizers, and authors of written materials in making NWFSC events and products as engaging and useful as possible.



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# WEBINARS

Webinars are intended for a broad audience (researchers, practitioners, community leaders, people living with fire) looking to understand and apply fire science in their communities or work. With such a broad audience, it can be difficult to parse and distill information into something everyone can understand. For the more complicated concepts in your presentation, it may be best to avoid going into too much detail and dive deeper upon request in the Q & A. Audiences are generally most interested in: what did you study and why, what did you find, and what does it mean or what should we (community, managers, practitioners, etc.) do with it? Thus, we generally encourage presenters to focus less on details of methodology and analysis and more on broader applications/implications of the research. Here are a few suggestions on how to prepare for your webinar presentation.

## Organizing your content

### Agendas

Creating an agenda and setting objectives provides structure to your presentation, and can let your audience know what to expect and what to look for.

- An agenda slide may include topic headlines, subheadings, time allocations, slide numbers, and relevant graphics.

### Signaling

Make it easy for your audience to follow your presentation. Include the main idea at the top of each slide.

- Short sentences with active verbs and nouns are most effective at conveying the main idea of the slide to your audience.
- If it's hard to come up with a single idea for the information on a slide, you may want to consider separating the information into two or more slides.
- Use clear transitions between sections of your presentation. One way to do this is by including a slide that summarizes the key points before proceeding to the next section.

### Chunking

By breaking down and organizing large amounts of information into smaller, more digestible groups of content, you can help keep your presentation simple and memorable for a broader audience.

- Complex or difficult subject matter that is harder to grasp should be presented in even smaller chunks, covering a limited number of ideas.
- Chunk at the slide level: include no more than 5 to 7 pieces of data or information on a single slide.
- If possible, organize your information into categories or patterns.
- Consider front loading information, such as recurring themes, key terms, or acronyms, that your audience may be unfamiliar with or that they should focus on.
- Provide opportunities for your audience to process information between sections of your presentation. We can offer a variety of ways for the audience to process and ask questions during the presentation. Presenters may choose whichever option works best for their presentation. Options include:
  - Asking if there are any questions between sections of the webinar, and answering those before moving on. To keep on schedule, we may need to limit the # of questions the presenter answers and hold any remaining questions until the end.

- Enabling the Q&A function in the webinar. NWFSC staff and moderators will monitor the questions, organize them, and ask them to the presenter when appropriate. Audience is encouraged to enter any questions they have at any time during the webinar.

## Presenting and communicating information

### Communication channels

Consider how your verbal presentation and visual slide composition interact to convey information.

- Your audience is more likely to comprehend content when you narrate information in a conversational style, rather than reading directly from your notes or presentation.
- Whenever possible, use visual aids or representations of data to support the key points you are narrating.
- Limit the amount of text on the screen. A combination of narrated information and supporting visuals are highly effective at ensuring transfer of information.

### Using visuals

Visual aids in the form of photos, diagrams, illustrations, graphs, maps, or videos are key to successfully conveying large amounts of information to your audience.

- Make sure your choice of visual(s) is in sync with your key message. Remove any visual(s) that you don't reference in your narration.
- For data-saturated visuals, emphasize or accentuate key points for your audience. Highlight important data, or direct your audience's attention to where it needs to go.
- Limit the number of visuals on a slide or consider how you can simplify the data presented in the visual(s). Keep only the most relevant information.

### Weeding

Most presentations tend to include too much written information which produces busy-looking slides that impede comprehension. Before finalizing your slides, check whether there is any extraneous text you can weed out.

- Use as few words as possible. A few keywords or phrases are easier to understand than complete sentences and blocks of texts.
- If there's something on a slide that you're not planning to narrate, it's usually best to remove it.
- Opt for using a visual or narrated form instead of text. Avoid redundancy between verbal and textual information.

## Connecting with your audience

When thinking about what kind of information to include or exclude in your presentation, or how you want to present the content, it can be useful to think about your audience and their needs.

- Leverage past knowledge and experience. Consider what your audience already knows about your topic and how they might have engaged with it, and build off of that.
- Use storytelling and narrative to engage your audience. Provide context for why this research was conducted and who was involved throughout the process.
- Connect your presentation to real-world examples and use cases. How is this information already being used? How might your audience use this knowledge?

# FIELD TOURS

When planning a field tour, preparation goes a long way in reducing uncertainty and creating a positive learning environment for those who are joining. Here are a few tips to help you create a memorable experience for your participants.

## Before the tour

Have a clear **agenda** with timed stops and drive times. Distribute copies of the agenda in advance and inform participants about the types of activities they may be required to partake in.

Provide a **checklist** of things to bring and clothes to wear.

Have a **medical** plan.

Prepare any **handouts** or copies of learning materials that you can distribute during your tour.

Check with participants to see if there are any **accessibility considerations**, and prepare any necessary accommodations.

## During the tour

### Engage positive emotions

Positive emotions, such as joy and curiosity, can stimulate learning and participation while negative emotions, such as fear and anxiety, can have adverse effects and impede learning.

- **Let participants know in advance what to expect throughout your field tour**, this may include learning objectives and goals, expectations for participation, and clear directions.
- **Create an open environment** by greeting participants at the beginning of your meeting, making time for each participant to introduce themselves, and providing guidelines for respectful interactions.
- **Encourage questions and comments** throughout the field tour. Build time into your agenda to respond to questions and address concerns.
- **Pay close attention to tone, facial expressions, and non-verbal body language** to gauge participants' emotional states and, if needed, adapt accordingly.

### Inclusive and accessible engagement

Create learning experiences that engage different learning styles by offering information in diverse formats and by providing a variety of opportunities to interact with the material.

- **Seek active engagement**, rather than passive listening. Identify activities that can safely involve participants' multiple senses and that take advantage of the field setting to deepen learning.
- **Vary your engagement forms** every 10 to 15 minutes. Use a combination of presentation formats, group activities, partner discussions, games, or individual reflection to keep your participants engaged.
- **Connect with your audience** by using their past experiences and knowledge to make the content relatable. Throughout the event, ask them questions about the content or allow them to share reflections or lessons learned.



## Provide opportunities for practice and application

Consider how participants can apply new knowledge to real-life challenges or scenarios.

- **Offer deliberate practice opportunities** such as small group discussions on different topics, asking participants to work on a few different scenario problems, or allowing participants to introduce a challenge they encounter in their life or work.
- **Provide participants with a sense of agency** by allowing for different forms of expression. Give participants a choice in how they apply and share what they learned.
- **Include time to debrief and provide feedback.** If participants will be evaluated, provide guidance beforehand on how this will be done. Highlight strengths and address knowledge gaps.

## After the tour

**Provide an opportunity for evaluation and sharing.** This could include a round robin debrief at the end of the tour, and/or an evaluation survey sent to participants within a few days. Document what worked well, what participants learned, and areas for improvement; and consider how you can use that input to plan future events and inform your ongoing science communication efforts.



# WRITTEN PRODUCTS

Written products of the NWFSC are generally intended to support fire science users in readily understanding peer-reviewed scientific literature and its relevance to their context. They offer summarized, accessible information about the most current fire science, highlighting key findings and management implications. The primary audiences are managers and practitioners from a range of disciplinary backgrounds, who often have limited time to review new science or analyze the state of science on a particular topic, but are seeking to incorporate it into their work. A further audience is scientists exploring topics in fields other than their own.

General guidelines, followed by additional information for the most common written products of the NWFSC, are outlined below.

## I. General guidelines

For all NWFSC written products, the NWFSC follows these general guidelines for effective written science communication:

- Maintain focus on the audiences and their reasons for reading the product: what are they seeking to learn, how much time might they have/not have, and what is their likely familiarity with the topic?
- Define all key terms and acronyms with their first use.
- Explain or define technical terms appropriately for audiences from outside the specific area of study. Consider using a text box to highlight essential technical concepts (See [Research Brief 25](#) for example, right).
- Use straightforward sentence construction and avoid overly long sentences.
- Limit use of the passive voice.
- Ensure that your distillation of scientific information retains the original meaning of the authors. Seemingly small changes in sentence structure and word choices have the potential to alter what you're communicating about findings and implications.
- Utilize selectively chosen, scientifically accurate images, figures, and/or graphics to help clarify and enhance key points. Avoid using too many graphs or figures, particularly those that would not be understandable to audiences without specialized scientific training.
- NWFSC syntheses include citations in Chicago style. A different citation style may be used if it is most appropriate to the body of literature being cited; the same citation style must be used throughout the document.

**Northwest Fire Science Consortium**  
A 1757 FIRE SCIENCE EXCHANGE NETWORK

**BIOLOGICAL DISTURBANCE AGENTS, FUELS, AND FIRE IN WESTERN CONIFER FORESTS**  
RESEARCH BRIEF 25 • FALL 2023

**Biological Disturbance Agents (BDAs):**  
Insects, pathogens, and parasitic plants, including both native and nonnative biota, that affect tree decline, mortality, and forest ecosystem processes. BDAs interact with abiotic factors such as fire and drought to determine forest composition and structure at stand and landscape scales. BDAs are a natural part of forest ecosystems and are essential to many forest functions; healthy forests are able to resist or recover from biological disturbance.

**KEY FINDINGS**

- BDA impacts on fuels and fire need to be considered in the context of ecosystem dynamics along with the afflicting BDA life history in a given location, including:
  - Whether the BDA manifests as an episode or as a chronic agent of tree defoliation and mortality;
  - The spatial scale that the BDA acts at.
- The review found little evidence to support the common belief that BDAs predominantly increase the likelihood and severity of wildfires.
- BDA impacts on fuels must be considered alongside interactions with existing forest structure, forest management legacies, future climate change and drought, and each other (e.g., overlapping BDA outbreaks).
- Because of their complex roles and influences on fuels that change over time, the consequences of BDAs on fire-related metrics and outcomes cannot be categorized as simply positive or negative.

*A young, healthy stand of lodgepole pine grows in the foreground with a backdrop of trees affected by a mountain pine beetle outbreak. Photo: US Forest Service Northern Region.*

*The Northwest Fire Science Consortium is a regional fire science delivery system for disseminating knowledge and tools, and a venue for increasing researcher understanding of the needs of practitioners.*

www.nwfirescience.org



## II. Research briefs

These are summaries of recently published peer-reviewed scientific studies relevant to manager and practitioner audiences. Typically, they cover one study, but can feature multiple papers on closely related topics if those are from the same project/team of authors (e.g., [Research Brief 24: Wildfire Risk in Western Oregon and Washington](#)). Their purpose is to concisely describe the study's aims, findings, and management implications. Each brief should include the following sections:

- **Introduction:** One or two short paragraphs that set the stage for why the study was conducted, why it is relevant to managers, and what the study is about. This should contain the most interesting and important information for user audiences, inspiring them to keep reading. The methods used in a study are also included in the introduction, in a very broad and basic way (e.g., *"the authors examined these impacts via a survey of community members/ by measuring streams and ecosystems 1 year after a fire/ by collecting and analyzing samples of..."*). Try to limit methodologies to one sentence, including only the general approach to the research.
- **Key findings,** prepared as a bulleted list, which may vary in length. Each bullet point should be no more than one sentence. In cases where a finding is more nuanced or multi-faceted, use sub-bullets to break into digestible parts.
- **Results,** which summarize each result in a header sentence and expand on it with a concise paragraph. The results section varies across research briefs and is often based on how the paper is structured and key findings are broken down into different topics/research questions/areas of research.
- **Management implications** that describe the potential application of these findings, limitations, and anything that can help readers understand if and how they can use study results in their local contexts. This is typically the most valuable part of this publication--why is this study important? How can a manager use the information/knowledge from this research? How does it contribute to our larger understanding of existing fire science?
- **Graphics:** Authors are encouraged to provide photos from or representative of the research, and/or a key figure from the paper that is simple enough to stand on its own with a very short caption. Otherwise, NWFSC will look for and include representative photos from publicly-available sources (e.g. government Flickr accounts) to break up the text.

## III. Syntheses and annotated bibliographies

### Syntheses

The length and structure of syntheses vary based on the topics covered, breadth and depth of available literature, and approach of the synthesis. However, all syntheses should include:

- An **abstract** that summarizes the synthesis topic, approach, and common themes, and includes quick links to major sections.
- A description of the **approach** used to define the topic, search criteria, determinants of literature to be included/excluded, analysis processes, and any other methodological aspects.
- A description of the **studies included**, and information such as the quantity of publications, dates, range of journals, and affiliations of authors. This can include a summarized in-text table and/or a more detailed appendix.
- **Common themes** in type of studies, findings, and implications.
- **Recommendations** for future research.

- When feasible, **tables** that break down the articles into identified themes with basic info (authors, year, etc.) and general methodology, key findings, and takeaways can be very helpful for concisely summarizing both the work and the takeaways from the synthesis.

**Graphics** can be very important in describing the body of literature synthesized, the key themes within it, and potential management implications. Consider developing an accompanying infographic that briefly and visually distills common themes and any best practices from across the literature synthesized (e.g., [Communicating with the public about wildland fire: A resource for practitioners to plan engagement strategies](#), below).

## Communicating with the public about **wildland fire**:

*A resource for practitioners to plan engagement strategies*



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This infographic summarizes recommendations from a review of 32 research studies about communicating with the public about wildland fire and smoke.<sup>1</sup>

Recommendations were grouped into three categories:

- 1 the **process** of communication,
- 2 key **content** to include in messages, and
- 3 which **messengers** and communication **medium** to use:



### How to use this document


Practitioners can use this document to brainstorm ways to engage in communication about wildland fire with the diverse people in areas where you work. The list of recommendations presented here is not exhaustive; rather, it is a starting point for consideration.



*This work was conducted by the University of Oregon, and funded by the Northwest Fire Science Consortium.*



The Northwest Fire Science Consortium works to accelerate the awareness, understanding, and adoption of wildland fire science in Washington and Oregon, and is funded by the Joint Fire Science Program's Fire Science Exchange Network.

<sup>1</sup>Santo, Huber-Stearns, and Smith. Communicating with the public about wildland fire preparation, response, and recovery: A literature review of recent research with recommendations for managers. Ecosystem Workforce Program Working Paper # 109. Fall 2021. University of Oregon.



UNIVERSITY OF OREGON

School of Journalism and Communication  
Center for Science Research Communication

## Annotated bibliographies

In many cases, NWFSC syntheses are also accompanied by an annotated bibliography that summarizes each article.

- Annotations differ from abstracts. Abstracts may still contain terms and complex methodologies that are inaccessible for the purpose of fully understanding the greater value of an article.
- Annotations may vary based on the diversity of different journals and the sections they require. However, each annotation should to the degree possible include:
  - **Research objective**--what is the research question driving this science, or why was this research effort needed?
  - General overview of **methods** used (population or location, means of analysis, key protocols, etc.).
  - **Main findings**: Summarize key findings, particularly in response to the stated research objective.
  - **Implications**: Utility of findings, calls for future research, discussion of limitations, or key discussion items presented for the research findings.