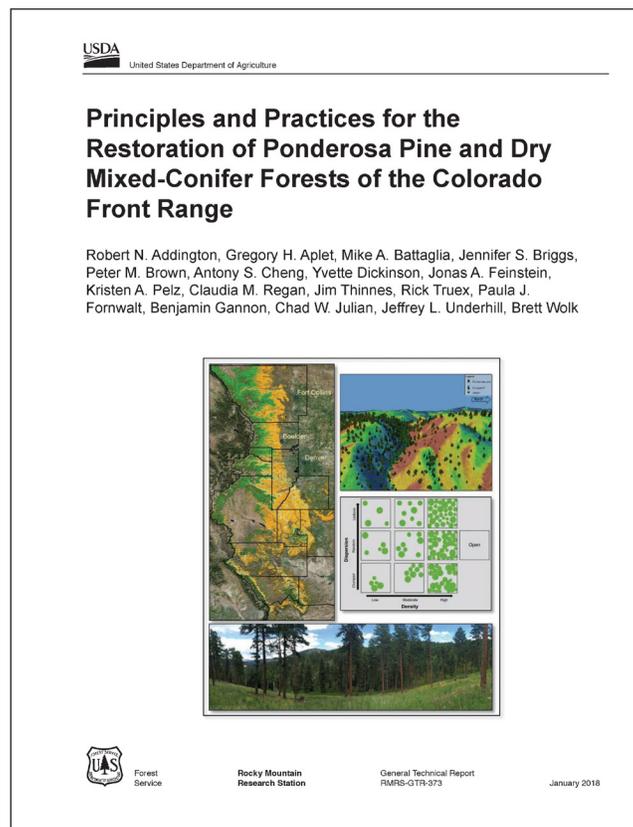


## General Technical Report 373 Outreach: *Summary of efforts, successes, and lessons learned*

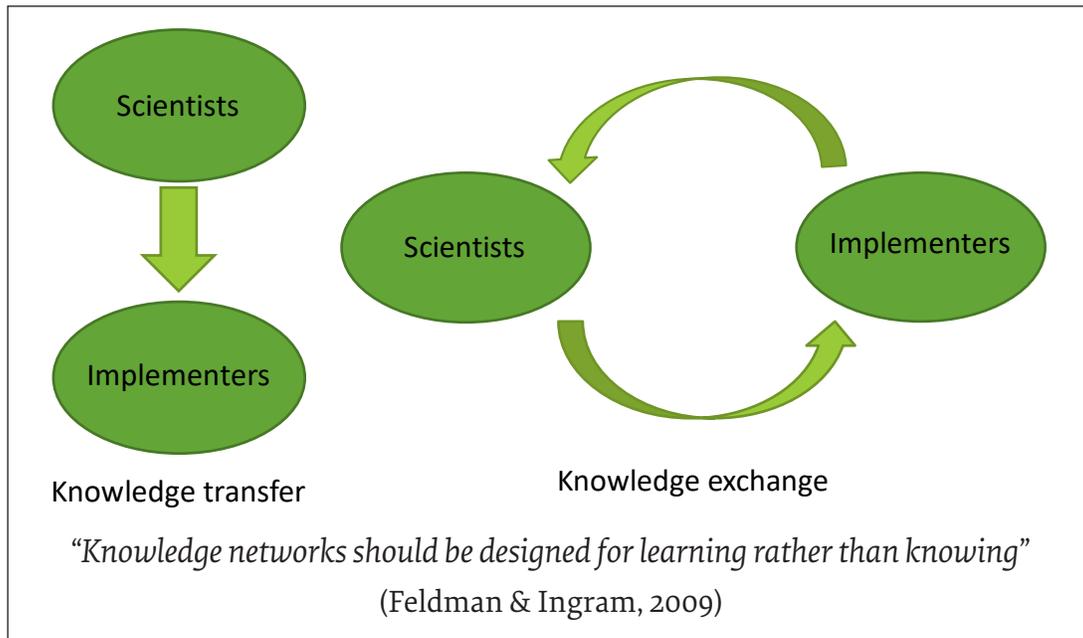
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Successful scientific outreach is a continuous, iterative, working process that can serve to improve communication and relationships across agencies and organizations for the long term. During the writing and publication of [General Technical Report 373: Principles and Practices for the Restoration of Ponderosa Pine and Dry Mixed-Conifer Forests of the Colorado Front Range](#) (GTR-373) a committed team of authors, land managers, and members of collaborative groups participated in an iterative process to make sure that the anticipated report was relevant, applicable, and useful on the ground. This paper outlines the decade-long development, publication, and outreach process that surrounded GTR-373, and presents a template for improved outreach surrounding similar publications.

### ***Developing GTR-373 by Moving Away from a “Knowledge Transfer” Model***

The traditional approach of “knowledge transfer,”—in which scientists publish and then unidirectionally present information to potential users and practitioners—assumes that the only thing standing in the way of implementation is that practitioners either don’t have or don’t understand the scientific information available; in other words, a knowledge deficit prevents implementation. It is generally not an effective strategy to simply publish scientific papers and expect their conclusions to be enacted in practice by the end user. This is especially true in a land management context, where managers juggle multiple goals, one of which may be forest restoration. There may be other important factors managers consider that impact the



implementation of scientific concepts. Other challenges, like budget constraints, lack of political will, and stakeholder conflicts may be more pressing concerns (Archie, 2014). Managers also cite the need for information at *relevant scales* (Archie et al., 2014, Briske et al., 2017), be they highly localized at the forest stand scale, or at the scale of a whole National Forest or watershed.

GTR-373 was born out of manager information need on Colorado’s Front Range. While wildfires have become larger and more severe over the past decade, the complex ecological, social and political context of the Front Range makes forest management challenging. While other publications (including [GTR 310: Restoring Composition and Structure in Southwestern Frequent-Fire Forests: A science-based framework for improving ecosystem resiliency](#)) had given some guidance for restoration in ponderosa and dry mixed-conifer forest types in other areas of the U.S., managers on Front Range forests were seeking a science-based framework that would incorporate locally-relevant approaches to address the specific challenges along Colorado’s Front Range. Authors from diverse agencies, organizations, and “-ologies” came together to develop treatment guidelines that would generally reduce forest densities and fuels and enhance spatial heterogeneity across scales, while retaining drought- and fire-tolerant species, old trees, and wildlife habitat. The goal was to co-develop a document that practitioners could use in the field to enhance forest resilience to disturbance and climate change.

The process of developing GTR-373 incorporated partners from over a dozen fields and organizations, and was designed from the beginning to be responsive to manager need, thereby avoiding the pitfalls of approaching the problem from a knowledge deficit perspective and ensuring that information would be developed and presented at operationally useful scales. In the “knowledge exchange” model exemplified by the GTR-373 process, scientists, managers, practitioners and other stakeholders engaged in conversations about challenges, opportunities, and results. This allowed managers and practitioners to share their information needs with scientists, and scientists then had the opportunity to include research that was directly applicable to management concerns.

Much of the success of our outreach was born long before publication through the co-development of the GTR. Ideas and concepts in the document were developed with managers and agency staff before the document was published. This process also helped to build and expand relationships between GTR authors and managers. Through co-development, authors were able to frame the information to be as useful as possible. It also sped up the learning process after the report was published, because many managers and agency staff were already familiar with the GTR concepts and authors before the publication and our formal post-publication outreach strategy began.

Long term collaborative groups are critical to developing and speeding adoption of new forest restoration science. When practitioners have had a hand in co-producing the science, they are much more likely to trust it and adopt it quickly (Roux et al, 2006; Feldman & Ingram, 2009; Dilling & Lemos, 2011; Cook et al., 2013; Polk, 2015). Moreover, long collaborative relationships ensure that the information contained in a report like GTR-373 speaks directly to the needs of potential users. Co-production shifts the focus of the report's authors from seeking to publicize and get practitioners on board with the information in the report, to having the report eagerly anticipated, with some concepts already being implemented because all participants are aware of the information the report will contain. Collaborative groups of mixed participants like the Front Range Roundtable, Upper South Platte Partnership, and Front Range Collaborative Forest Landscape Restoration Program (CFLRP) were already in place on the Colorado Front Range, and these groups in particular were critical to the co-production of GTR-373. Regular meetings of these groups provided sustained forums where both research-focused forest scientists and practitioners of that forest science stayed continually engaged in an iterative process. Field trips and workshops hosted by these collaboratives also provided opportunities for authors and managers to discuss direct, place-based questions. Long-term collaborative groups served as incubators for developing the GTR with many perspectives involved in the conversation, provided opportunities for targeted outreach and implementation, and provided vital funding.

### ***The GTR-373 Knowledge Exchange Process: Outreach During Document Development and After Publication***

Because GTR-373 was truly co-produced, our outreach process was informed by both informal connections between participants and a more formal outreach strategy. The informal and formal approaches were not truly separate from one another, and happened concurrently; however, for clarity they are discussed separately here. For the most part, the informal outreach process can be defined as the steps the author team took during the writing of GTR-373 to incorporate perspectives outside the author team. The formal outreach was undertaken by a dedicated outreach team after publication.

#### ***Informal and Formal Outreach During Development***

The informal outreach strategy relied on existing networks and interpersonal connections, and leveraged existing networks already in place from collaborative groups like the Front Range Roundtable, Upper South Platte Partnership, and CFLRP to gather feedback throughout the GTR-373 process and publicize the report after publication. GTR-373 authors also did extensive outreach within their personal networks using email, phone conversations, and in person meetings, happy hours, and chance encounters to gather and share information. As the science progressed during the development of the GTR, review sessions on drafts of the publication, updates, and field trips made information accessible to those beyond the immediate author team.

One example of the kind of interaction authors had with agency staff while writing GTR-373 were two workshops held around 2013 for staff from the Pike and San Isabel and Arapaho & Roosevelt National Forests to give feedback on an early GTR draft. These were well attended by more than 30 staff from each office and 3-5 authors at each workshop. Primary author Rob Addington took the notes and feedback provided and incorporated it directly into the next draft of the GTR. This kind of responsive outreach during the research and writing process for the report ensured relevancy, and created goodwill and trust in the final product.

Within the CFLRP, there were meetings specifically designated to exchange results from monitoring on CFLRP projects called "Jam Sessions." These were important opportunities to share updates about the document, and about what monitoring results said about the treatments that were happening. For example, early results showing that there was in fact still a lot of Douglas-fir in some of the treatment areas let managers know that they could remove more. Many of the concepts that became GTR-373 were presented and discussed in these Jam Sessions. The structure of the CFLRP meant that there was a lot of organic information exchange going on—it wasn't being done specifically for the creation of GTR-373.

Such knowledge exchanges were also deemed reliable enough that some managers had completed restoration treatments based on GTR-373 concepts long before publication—as of this writing, the outreach team has used two of these restored areas as demonstration sites for field workshops. The question of what factors were at play that made this informal outreach so effective is an area of active research.

### **Formal Outreach After Publication**

A designated outreach team came together as publication of the report grew near. The outreach team's first task in the months preceding the publication of GTR-373 was to consider similar forest restoration GTRs and determine what successful outreach strategies their authors had used. Interviews with the authors of past GTRs and identified that:

1. Though they are resource intensive in terms of time and cost, field workshops were the most effective way to share information. Research bears this suggestion out: field workshops and other information sharing events are the most effective and engaging method of sharing science (Laastch & Ma, 2016).
2. Demonstration sites are key in helping people to visualize concepts in action. As Richard Reynolds, GTR-310 author says, "A picture is worth a thousand words, but a demonstration site is worth a thousand pictures."
3. Leadership inclusion and support is crucial to adoption of any scientific concepts.

Using past GTR outreach processes as a guide, the outreach team defined a clear goal and objectives for the GTR-373 outreach:

**Goal:** for the publication to become a well-known reference and resource for managers to use to successfully implement and communicate the concepts synthesized within the report.

#### **Objectives and Strategies:**

1. For public and private forest managers and partners to know the GTR has been published
2. Improved understanding of the Front Range GTR concepts
3. Enhance productive dialogue across forest planning & management efforts

To reach managers in multiple agencies and organizations, the outreach team sent information about the GTR and its contents through the existing collaborative networks mentioned above, the Society of American Foresters, the Southern Rockies Fire Science Network, the Society for Ecological Restoration, and agency leadership listservs. To improve understanding and enhance dialogue, the outreach team's partners at the Rocky Mountain Research Station released two science briefs summarizing the main findings in the report (a [detailed](#) and a [two-page](#) summary).

Formal outreach also included multiple presentations to forest leadership and employees from the Pike-San Isabel and Arapaho-Roosevelt National Forests, and more informal pub talks to wider interested audiences working in academia, forestry, fire, and restoration along Colorado's Front Range (Table 1). The GTR-373 authors shared slides and presentation material so they would give similar messages no matter which member(s) of the author team were giving the presentation. Rather than having one spokesperson, the author and outreach team focused on developing consistent themes that could be presented by many voices. These presentations carefully took their audiences into account; for example, the pub talks were much more informal and image-based than presentations for forest leadership. Different authors were able to speak to many different audiences—in choosing a speaker to give a particular presentation, the goal was to send the best author possible to speak to that specific audience with a unified message.

Table 1: Audiences who have received presentations about the GTR-373 history and concepts.

Presentation Audiences	
US Forest Service Region 2 Office	Colorado State University Society of American Foresters student chapter
Front Range Collaborative Forest Landscape Restoration Program	Colorado State Forest Service
Staff of the Pike-San Isabel and Arapaho-Roosevelt National Forests	Society for Ecological Restoration Rocky Mountain Chapter
Colorado Forest Restoration Institute's Fire Lab	Front Range Community College Natural Resources Program
Colorado/Wyoming Society of American Foresters Meeting	Community Groups: Forsythe Multiparty Monitoring Group, pub talks
Colorado State University Forest and Rangeland Stewardship Department	

### **Outreach Lessons from Field Workshops**

Based on the information the outreach team gathered from the authors of past GTRs about the effectiveness of field workshops as knowledge-exchange mechanisms, RMRS communication staff worked with Colorado Forest Restoration Institute employees to host nearly 200 practitioners at two field workshops on the north and south Front Range. These workshops took about six months to plan completely, and took the bulk of the outreach team's resources and time.

The goals for these workshops were:

1. Have a diversity of participants and mix them up so they didn't spend all day talking to people they already knew.
2. Hands-on/interactive approach to key concepts from the GTR associated with planning, implementation, and monitoring.
3. Visit areas where these concepts had been implemented to tell the story "worth a thousand pictures."

Offering field workshops on the north and south Front Range gave participants multiple opportunities to attend, and made information even more locally relevant to land managers. The North Field Workshop focused on the implementation of GTR concepts on private lands, while the South Field Workshop was focused on public lands. The curriculum addressed specific topics in the GTR: environmental gradients, "forensic forestry", stand level monitoring, landscape level monitoring, turning desired conditions into prescriptions, and adaptive management. Each of these topics was turned into a place-based "station."

### **Successes:**

- **Commitment** of the authors, field workshop station facilitators, and CFRI and RMRS funding and staff throughout the process—the people who wrote the report did the work to share their knowledge and experience, reach out to partners, and be involved in workshop activities. Their involvement did not end with the publication of the report.
  - This has been true in other successful GTR rollouts as well.
- **Connecting** the concepts to the landscape. It was very important to select sites that could illustrate what restoration using GTR-373 actually looks like.
  - Scouting trips and dry runs gave us the ability to connect the curriculum to the landscape and avoid logistical pitfalls.

- **Interactive** stations received specific, positive feedback in evaluations. In fact, the stations that were interactive were the only stations specifically mentioned in the evaluations.
- Succeeded in getting a **diverse** group of participants from academia, the scientific community, private, state, and federal land managers at different levels, and from different agencies, non-profits, contractors, and others.
- **Planning** extensively with a team dedicated to coordination and logistics made things run smoothly and gave participants and presenters the opportunity to think about the GTR-373 concepts, not the field workshop logistics.
  - Some back-of-the-envelope math suggests that there were over 100 employee hours dedicated just to logistics work for these field workshops. To make these well-organized, anticipate that this will be someone's (or several someones') entire job in the run-up to the trip.
  - Scouting trips and dry runs gave on-the-ground information about travel time between sites, where to eat lunch, where to host stations, and where to put porta-potties.
  - A day-of facilitator kept the trip running smoothly and on time, and allowed adherence to a tight schedule.

### ***Areas for Improvement:***

- Some portions of the workshop were not interactive, though that was one of our goals. In retrospect, it might have been a good idea to agree more clearly on the expectations for interactivity with station leaders, and brainstorm as a group. We could have better dialed in with the presenters about what was interactive in their presentation and get them on board with the idea of moving beyond presenting the concepts outdoors and towards participatory learning.
  - Could have prepared these presentations and activities more in advance and received feedback from the workshop committee.
  - More scientist training about how to facilitate interactive learning
- We did dry runs to locations to measure things like actual driving time and scouting parking etc., but not practice runs of the station presentations. Presentations moved more smoothly and on time in the second workshop, which suggests presenters benefited both from practice and feedback from evaluations of the first workshop.
- Time limitation was a concern, as many stations did feel rushed.

### ***Evaluating Communication Efforts***

At all presentations and workshops, the outreach team presented a standardized survey about the effectiveness of communication efforts. This survey was given to federal, non-profit, and state employees, academics, and leadership, planners, and implementers at the 5 presentations and 2 workshops between November 2017 and November 2018. The evaluation results indicate how successful the GTR-373 team's knowledge exchange efforts were, and how to improve them in the future. Overall, the presentation evaluations were very positive, and affirmed that the information in the presentations was valuable and it was presented in a way that was easy to understand (Figure 1).

The evaluation results for the field workshops were similarly positive overall, but there are a few key differences that speak to the strength of field workshops as knowledge exchange mechanisms compared to more traditional presentations (Figure 2).

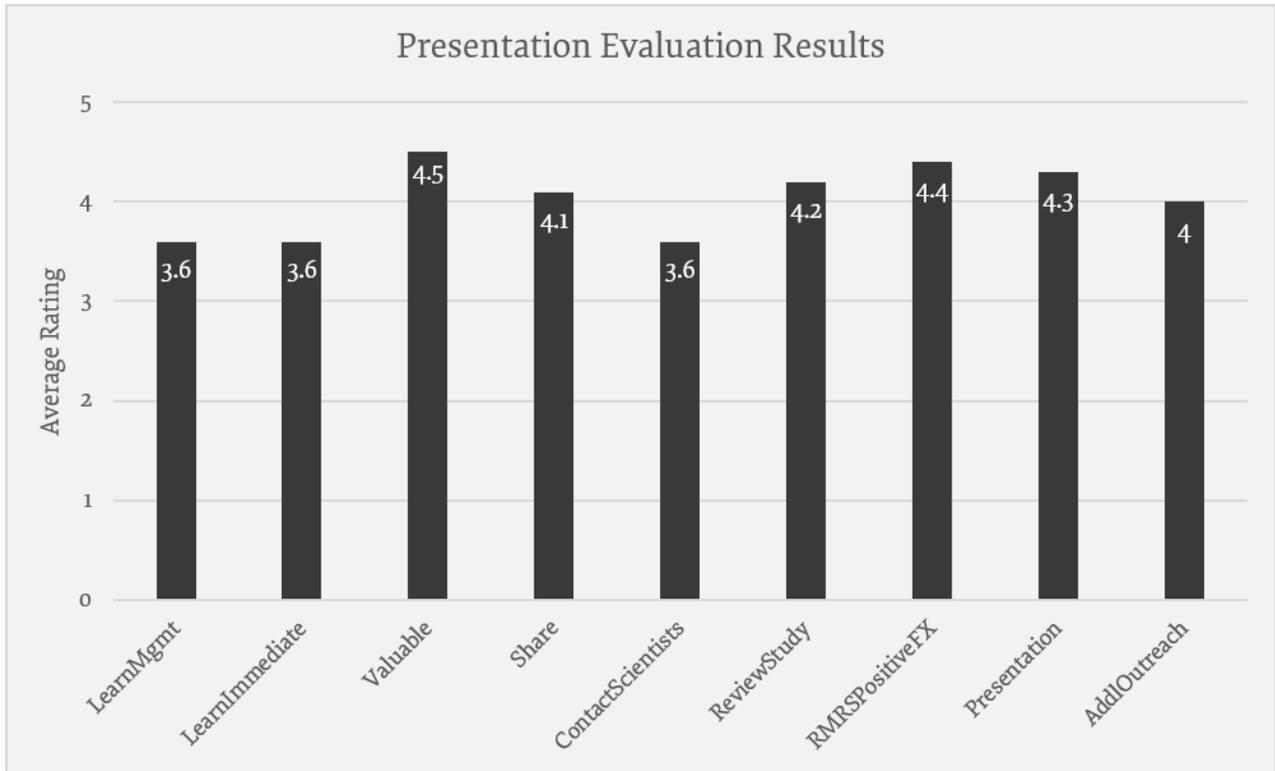


Figure 1: Evaluation results from presentations, pub talks, etc. compiled. See appendix A for full survey with questions abbreviated here.

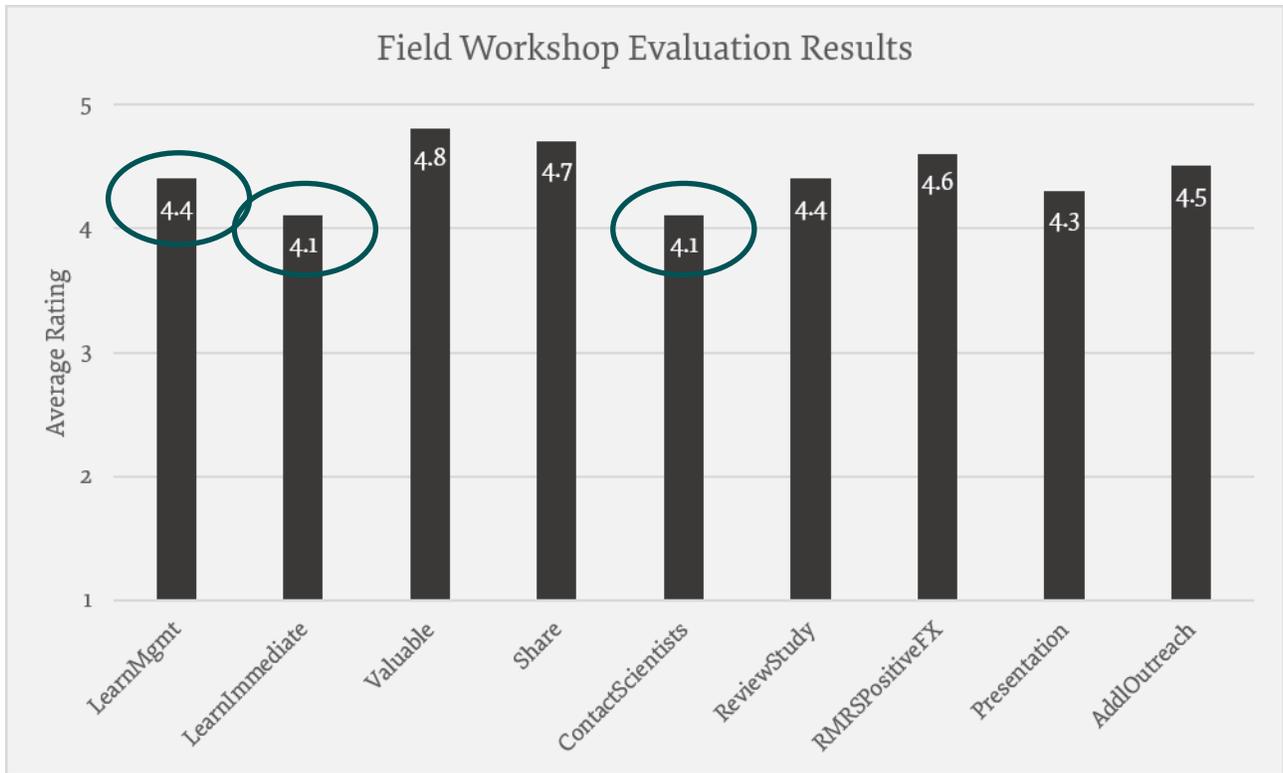


Figure 2: Evaluation results from north and south field workshops. See appendix B for full survey with questions abbreviated here.

The information was presented more effectively in field workshops, as more participants reported that they learned information they could use immediately to address their forest management needs. After workshops, participants were more likely to report their interest in contacting scientists than after presentations. This suggests that field workshops during which people are able to interact more and get a hands-on perspective may support building long-term knowledge sharing better than presentations. Scientists and managers may feel more comfortable forming new working relationships after spending several hours in the field discussing concepts and engaging in conversation. The development of long-term communication networks over time is important for improving relationships and sharing scientific information, and local knowledge networks are a very important way for scientists and managers to determine what they need from one another (Seipen & Westrup, 2002; Feldman & Ingram, 2009; Dilling & Lemos, 2011).

Managers want information at relevant scales for management, which are often local scales (Archie et al., 2014). GTR-373 and the workshops especially were designed with this need in mind. However, practitioners are still seeking information that is not just locally relevant, but also actionable. Common feedback for both workshops and presentation evaluations asked for more information about how these concepts could be applied to their specific management areas, specifically how to design and implement prescriptions. On the ground outreach is optimal but restricted by resources—putting on a successful field workshop is extremely resource intensive.

### ***Lessons Learned***

- It is very important to develop clear communication objectives and revisit to them often to evaluate whether the steps you're taking support the objectives.
- Identifying audience and outreach mechanisms can keep your advertising on track and make your efforts efficient.
- The commitment of the author team throughout the process is key. In order to make outreach successful, the authors should be heavily involved in knowledge-exchange opportunities.
- Interactive learning is very valuable. Field workshop stations that received the most positive feedback were those that had strong visual and interactive components based in the place.
- Evaluating your own outreach process allows you to draw conclusions about what was successful and what could be improved. For example, we reviewed evaluations from the first field workshop with the presenters and there was improved efficiency and communication in the second workshop.
- Because we engaged with managers and practitioners throughout the process of developing GTR-373, we were confident that the information in the report would be relevant and useful.

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## Appendix A: Survey for Presentations

### EVALUATION

Location (e.g. Pub Talk)

Date

Please take a few minutes to respond to the following questions to evaluate the information presented today. Your responses will help us to plan for and improve future outreach efforts. Thank you!

- Please indicate your agreement with the following statements, on a 1 to 5 scale (1 = Strongly Disagree; 5 = Strongly Agree; 0 = Not Applicable)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
I learned something that will help me address my forest management information needs.	1	2	3	4	5	0
I learned something I can use immediately.	1	2	3	4	5	0
The information that was presented today is valuable.	1	2	3	4	5	0
I will share the information I learned about today with other people.	1	2	3	4	5	0
I plan to learn more about the information presented today by contacting the scientists involved.	1	2	3	4	5	0
I plan to review the research study that was presented today.	1	2	3	4	5	0
The Rocky Mountain Research Station has a positive effect on how science is distributed to natural resource managers.	1	2	3	4	5	0
The way the material was presented today made it easy to understand.	1	2	3	4	5	0
I am interested in learning more about this topic through additional outreach opportunities.	1	2	3	4	5	0

- What did you like most about today's presentation?
- What did you like least about today's presentation?
- What do you think are the best ways to share this information?
- Which category best describes your area of employment? (Please choose only one)
  - \_\_\_\_\_ U.S. Forest Service
  - \_\_\_\_\_ Other Federal Agency
  - \_\_\_\_\_ State Agency
  - \_\_\_\_\_ Local Government
  - \_\_\_\_\_ Non-profit
  - \_\_\_\_\_ Consulting Firm
  - \_\_\_\_\_ Academia
  - \_\_\_\_\_ Other: (please specify) \_\_\_\_\_

6. How many years have you been in this position?  
\_\_\_\_ Less than 2 years  
\_\_\_\_ 2 - 5 years  
\_\_\_\_ 6 - 10 years  
\_\_\_\_ 10 + years
7. In what ZIP code is your place of work located? \_\_\_\_\_
8. Any additional comments?

## Appendix B: Evaluation form for field workshops

### EVALUATION

**Location (e.g. South Front Range Field Workshop)**

**Date**

*Please take a few minutes to respond to the following questions to evaluate the information presented today. Your responses will help us to plan for and improve future outreach efforts. Thank you!*

- Please indicate your agreement with the following statements, on a 1 to 5 scale (1 = Strongly Disagree; 5 = Strongly Agree; 0 = Not Applicable)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
I learned something that will help me address my forest management information needs.	1	2	3	4	5	0
I learned something I can use immediately.	1	2	3	4	5	0
The information that was presented today is valuable.	1	2	3	4	5	0
I will share the information I learned about today with other people.	1	2	3	4	5	0
I plan to learn more about the information presented today by contacting the scientists involved.	1	2	3	4	5	0
I plan to review the research study that was presented today.	1	2	3	4	5	0
The Rocky Mountain Research Station has a positive effect on how science is distributed to natural resource managers.	1	2	3	4	5	0
The way the material was presented today made it easy to understand.	1	2	3	4	5	0
I am interested in learning more about this topic through additional outreach opportunities.	1	2	3	4	5	0
While planning forest management projects, it is important to consider the environmental gradients (e.g. latitude, elevation, slope, soils, moisture etc.) present at a site.	1	2	3	4	5	0
Past stand structure can help to inform forest management.	1	2	3	4	5	0
Monitoring is a tool to determine if management objectives are being met at a stand or treatment level.	1	2	3	4	5	0
Monitoring can help inform future forest management decisions.	1	2	3	4	5	0

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
At the watershed scale, monitoring should be focused on vegetation patterns and their influence on landscape-level ecological processes such as fire behavior and watershed function.	1	2	3	4	5	0
GTR 373 empowers me to operate at a watershed scale to achieve landscape-level goals across jurisdictions and ownerships.	1	2	3	4	5	0
I feel comfortable using the concepts introduced in GTR 373.	1	2	3	4	5	0

2. What did you like most about today's workshop?
3. What did you like least about today's workshop?
4. What do you think are the best ways to share this information?
5. What challenges do you foresee implementing the concepts presented in GTR-373?
6. What opportunities do you see after the GTR-373 workshop?
7. Which category best describes your area of employment? (Please choose only one)
  - \_\_\_\_\_ U.S. Forest Service
  - \_\_\_\_\_ Other Federal Agency
  - \_\_\_\_\_ State Agency
  - \_\_\_\_\_ Local Government
  - \_\_\_\_\_ Non-profit
  - \_\_\_\_\_ Consulting Firm
  - \_\_\_\_\_ Academia
  - \_\_\_\_\_ Other: (please specify) \_\_\_\_\_
8. How many years have you been in this position?
  - \_\_\_\_\_ Less than 2 years
  - \_\_\_\_\_ 2 - 5 years
  - \_\_\_\_\_ 6 - 10 years
  - \_\_\_\_\_ 10 + years
9. In what ZIP code is your place of work located? \_\_\_\_\_
10. Any additional comments?