

Technical Transfer Framework

Sagebrush Technical Transfer Network | 2025

What is the Technical Transfer Framework?

Technical transfer is needed to ensure that relevant technical information, including science, data, technology, and practices, informs management decisions and actions. The **Technical Transfer Framework** provides a flexible, 5-step guide to planning and implementing technical transfer efforts for anyone who supports others in using technical information within resource management. It focuses on building skills to execute an effective technical transfer effort, emphasizing what is done *before*, *during*, and *after* technical transfer. Although our work is centered on rangeland ecosystems because our network's members work in these systems, the concepts presented here apply more generally to natural resource management.

An Introduction to Technical Transfer

WHAT IS TECHNICAL TRANSFER?

Technical transfer is a collaborative, participatory practice that supports the integration of relevant science, data, technology, and practices into natural resource management decisions and actions.

WHO DOES TECHNICAL TRANSFER?

People with a variety of backgrounds have a place in technical transfer. Technical transfer can be done by dedicated technical transfer professionals, university extension or research faculty, scientists, agency resource specialists or biologists, communications specialists, and anyone else who supports others in using technical information in resource management.

ARE THERE OTHER TERMS FOR TECHNICAL TRANSFER?

You may have heard technical transfer referred to as extension, technology transfer, science-to-implementation, science-to-practice, science integration, or other terms.

WHY IS TECHNICAL TRANSFER NEEDED?

The rangeland profession has made great strides in producing applied science, datasets, maps, tools, and practices to support resource management. Technological advances provide opportunities to use a wealth of powerful new knowledge in decision-making. However, the adoption and use of these products and practices in resource management have lagged behind their development. It is often difficult for resource managers to access, interpret, integrate, or apply this information to their management decisions, and the large volume of products leads to information overload.

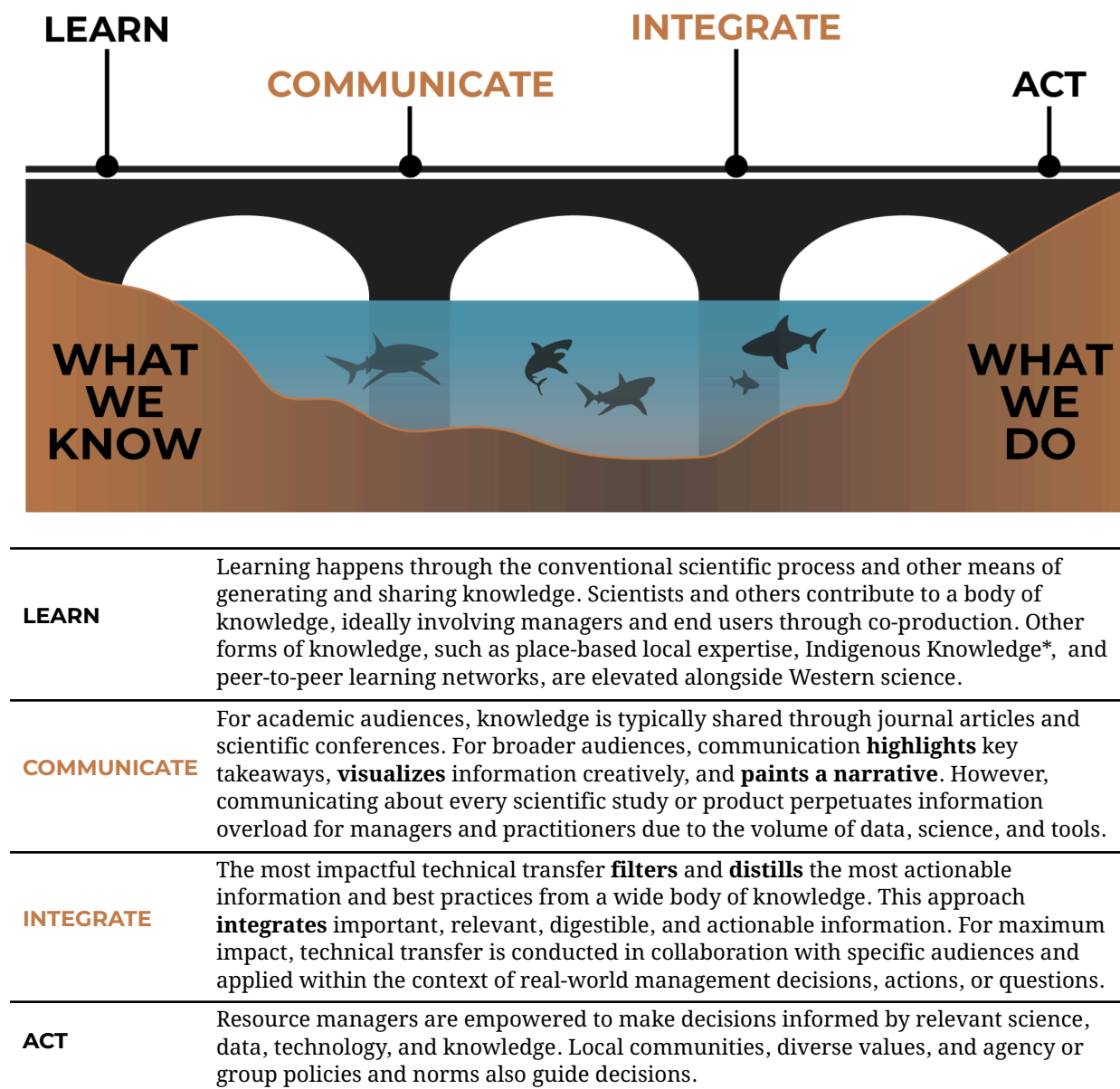


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WHAT DOES TECHNICAL TRANSFER LOOK LIKE?

Technical transfer bridges **what we know** and **what we do** (Figure 1). Concerted, collaborative, bidirectional effort is needed to move technical information developed from learning and knowledge generation processes into action. Communicating and integrating technical information—key technical transfer actions—help bridge this gap.



* We emphasize the importance of Indigenous Knowledge and other ways of knowing as equal to Western Science. However, technical transfer is not an appropriate process for engaging with Indigenous Knowledge. Indigenous Knowledge requires relationships with Indigenous Peoples through a process that is participatory and inclusive, not extractive and appropriative. Mutually beneficial partnerships centered in place, respecting Tribal and Indigenous sovereignty and land rights, protecting Indigenous Knowledge and Indigenous People, and acknowledging historical context and injustice are one model for integrating Indigenous Knowledge with decision-making. This model likely differs from how practitioners engage with Western Science.

Figure 1. Technical transfer connects what we know and what we do, addressing barriers to accessing, interpreting, applying, and integrating information into resource management.



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The Technical Transfer Framework

The **Technical Transfer Framework** provides a flexible, 5-step guide to planning and implementing what is done *before*, *during*, and *after* technical transfer as a resource for people engaging in the art and science of technical transfer. Importantly, the framework is **participatory**, meaning that all stages of the technical transfer effort should engage and center its audience. As you use the framework, remember that the importance of relationships, trust, and credibility cannot be overemphasized. Consider also that technical transfer is not a linear process, and the parts of this Framework may require revisiting throughout the technical transfer process.

This framework integrates with the other Sagebrush Technical Transfer Network content (Figure 2). Use the [Shared Principles of Technical Transfer](#) to help guide your approach to each step of the Framework. The [Planning Worksheet](#) and [Reflection Worksheet](#) support the Technical Transfer Framework by providing specific questions for your team to answer when planning and evaluating your efforts. **Case Studies** provide real-world examples documenting different approaches and lessons learned.

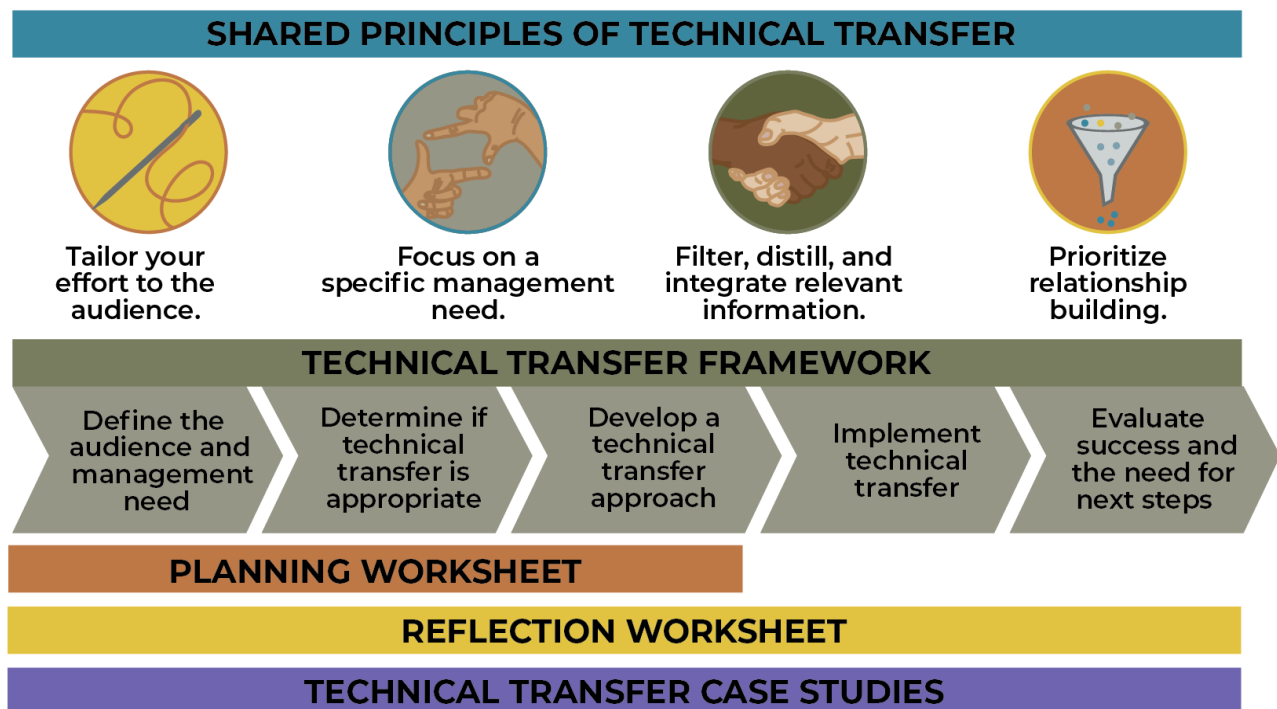


Figure 2. Sagebrush Technical Transfer Network content map.



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Before Technical Transfer

① DEFINE YOUR AUDIENCE AND MANAGEMENT NEED

To center your effort, identify the “for who?” and the “why?”

Key technical transfer principles: Tailor your effort to the audience; Focus on a specific management need; Prioritize relationship-building

The **audience** is a specific set of end users who are usually involved in decisions or actions related to resource management. They have a **management need**: for a topic of resource management importance, needs related to a specific management decision, action, or question. They may have a defined decision space or process for making and implementing decisions or actions. They may have specific ways in which they can or are required to incorporate technical information into management. Ideally, the audience is specific. However, on lower levels of the Proficiency Pyramid (Figure 3), it may be broad.

The technical transfer effort should help integrate relevant technical information, including science, data, technology, and practices, into the audience’s decision-making process. Each effort must be tailored to the audience’s social, cultural, and institutional context, decision process, and **knowledge or skill level**. A technical transfer effort may have multiple audiences, but approaches (Step 3) should be tailored to each.

Key questions for Step 1:

- A. What is the management need? Why is this management need important? What resource management decision, action, or question is being addressed?
- B. Who are your intended audience(s) or end-user(s)? What role(s) do they play in addressing the management need?
- C. What is the desired level of proficiency you’d like the audience to have following technical transfer (Figure 3)?
- D. What is your audience’s technical skill level relative to the topic?
- E. How can your audience use information to inform a decision, action, or question?

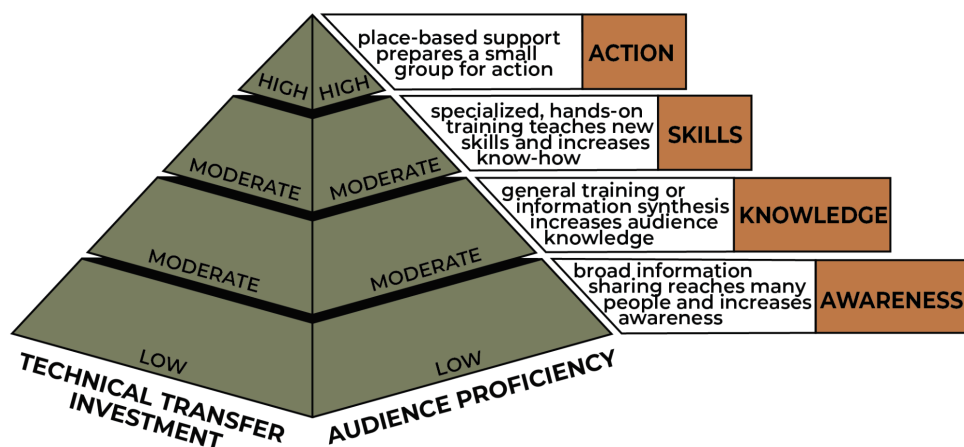


Figure 3. The Proficiency Pyramid is a tool to match technical transfer approaches to desired audience outcomes.

Supporting documents:
[Planning Worksheet](#)



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② DETERMINE IF TECHNICAL TRANSFER IS APPROPRIATE

Verify you are using the appropriate tool for your audience's needs

Key technical transfer principles: *Tailor your effort to the audience; Focus on a specific management need*

Technical transfer is not always the most effective solution to a management need. Before beginning a technical transfer effort, verify that technical transfer is appropriate for your situation by considering Table 1 (next page). **You do not need to meet all of these conditions**, but if any of these “enabling conditions” are absent, you may need to consider additional approaches to strengthen your effort.

Supporting documents: [*Planning Worksheet*](#)

③ DEVELOP A TECHNICAL TRANSFER APPROACH

Tailor your approach to your audience's needs and desired outcomes

Key technical transfer principles: *Tailor your effort to the audience; Focus on a specific management need; Filter, distill, and integrate relevant information; Prioritize relationship-building*

Selecting an approach for your technical transfer effort is about increasing your audience's proficiency in a focused, engaging, and participatory way. There is no one-size-fits-all technical transfer approach. Each effort should center its audience's management need, social, cultural, and institutional context, decision process, and level of knowledge or skills.

Key questions for Step 3:

- A. *What does success look like for this effort?*
- B. *What are the learning outcomes or the main take-homes for your audience? What do you want them to walk away with?*
- C. *How does your approach filter, distill, and integrate information from a broad body of knowledge? What are the barriers to the audience accessing, interpreting, and applying this information?*
- D. *What format(s) will likely be successful for your management need, audience, and desired proficiency level (Figures 3 & 4)?*
- E. *Who are the most effective messengers for your audience? Which individuals and institutions have trust and credibility with this audience and sufficient knowledge to carry out the technical transfer?*
- F. *Are there other relevant research or technical transfer efforts that focus on this management need? If so, how can your work synergize with these efforts?*



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Table 1. Use this table to assess if technical transfer is an appropriate approach for your audience and management need. Not all conditions must be met to proceed with technical transfer, but consider what complementary approaches may support your technical transfer efforts.

Technical transfer may be most appropriate when:	If conditions are not met, consider:
<i>Data, science, or other information can influence the management need (i.e., it is not dictated by policy, law, regulation, etc.).</i> Sometimes, technical information cannot change decisions or processes in resource management. Ensure your audience's decision-making process can actually be informed by technical information before embarking on technical transfer.	Address policy considerations if policy dictates or inhibits decision-making.
<i>A sufficient volume of actionable information (science, data, traditional or local knowledge, etc.) exists to inform management need.</i> The information you are sharing must be supported by sufficient science, data, traditional or local knowledge, or technology to be actionable. Not every new innovation or research finding can or should be acted upon. Sometimes, more evidence and refinement may be needed before asking people to change their actions. Although there will always be uncertainty and knowledge gaps, technical transfer may be most appropriate when enough information has been accumulated to be compelling and actionable.	Facilitate the co-production of knowledge with an integrated technical transfer plan if more information is needed to bridge science and management.
<i>You have relationships, trust, and credibility with an audience that can influence decisions or actions related to the management need.</i> All technical transfer efforts should center relationships with the audience. Trust and credibility are needed for successful technical transfer. Researchers or outside entities may not be trusted, so your technical transfer team may need to include those already trusted by your audience.	Build relationships before implementing technical transfer if your team lacks trust and credibility with the audience.
<i>The social and administrative conditions exist to set your effort up for success. Your audience is ready to act.</i> Conservation readiness refers to the convergence of enabling social, administrative, and ecological conditions necessary for effective and durable conservation action. Technical transfer may not be appropriate if the right social and administrative conditions are not in place to support adoption. Your audience must also be willing and ready to change their perceptions, actions, and behaviors.	Use the Conservation Readiness Framework to move towards conservation readiness.
<i>Your team has the capacity (time and skills) to address at least some technical transfer barriers for this management need.</i> Technical transfer takes a diverse skill set and requires dedicated time and effort. Consider building capacity or teaming up with others. If capacity is limited, you may need to adjust your expectations for the level of proficiency you can achieve.	Consider joining the Sagebrush Technical Transfer Network to build your technical transfer skills.



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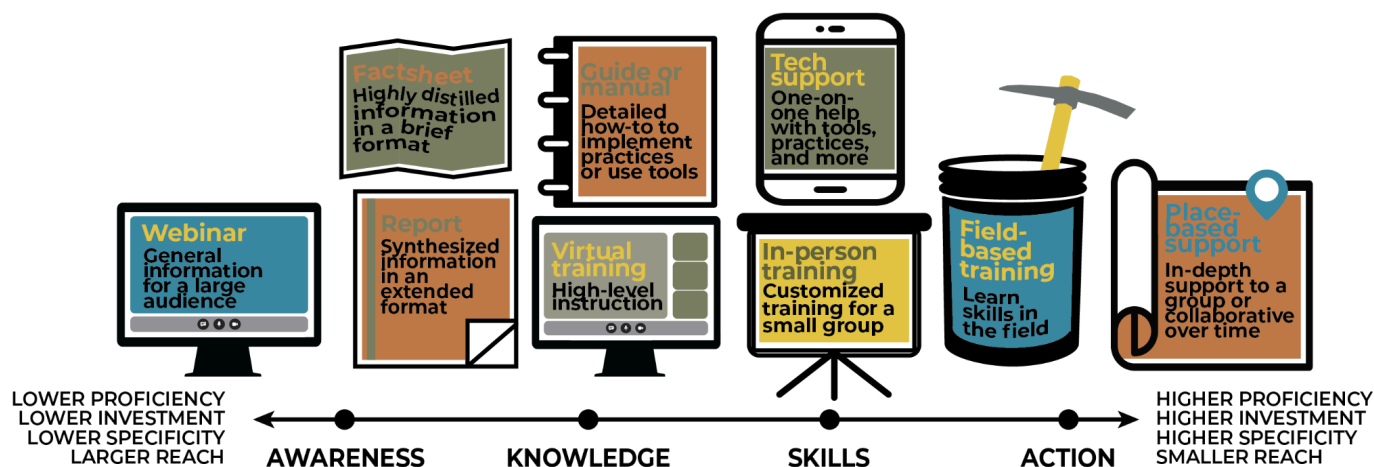


Figure 4. Consider what format(s) might help your audience reach the desired level of proficiency (see Figure 3).

Supporting documents: [Planning Worksheet](#)

During Technical Transfer

④ IMPLEMENT TECHNICAL TRANSFER

Follow your technical transfer approach and use best practices for a successful technical transfer effort

Key technical transfer principles: Tailor your effort to the audience; Focus on a specific management need; Filter, distill, and integrate relevant information; Prioritize relationship-building

Key components of implementing a technical transfer effort include:

- Keeping it centered on the “why?” of the management need throughout.
- Empowering your audience, not just educating. After all, “telling ain’t training”! Where possible, seek opportunities to facilitate peer-to-peer learning, spark conversation among colleagues, and foster relationship-building among participants that will extend beyond the technical transfer effort. Integrate hands-on or other interactive activities as much as possible, and consider using multiple formats or approaches that address varying learning styles (Figure 4).
- Focusing on what the audience *really* needs to know. Be aware of information overload. Understand that adults learn best when information provides a personal benefit, relates to their experience, and can be used immediately. Rely on your 3-4 main messages, and reinforce them repeatedly. Use plain language when possible.



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- Coming prepared. Ensure you have adequate capacity for facilitation and other needs to make the technical transfer run smoothly, especially for in-person events. Build flexibility into your approach to adapt to your audience's needs. For example, in a workshop or webinar, leave a buffer for extra time for discussion in case it is needed.

After Technical Transfer

⑤ REFLECT ON YOUR SUCCESS AND THE NEED FOR NEXT STEPS

Assess how you did and what's next

Key technical transfer principles: Prioritize relationship-building

Key components of evaluating a technical transfer effort include:

- Assess how your outcomes measured up to the vision of success you set before the effort was underway. Did your audience meet your desired learning outcomes or internalize the key take-home messages? For longer-term outcomes, are concepts being carried forward into the day-to-day work of your audience? Is there an increase in technical tools or a common language being used among your audience, where applicable?
- Consider your audience's view of the effort's success and potential for building and maintaining relationships. Are there opportunities to strengthen relationships with your audience, and would they work with you again?
- Evaluate if additional steps are needed to achieve success. Have you identified new technical transfer needs through your effort? Do you have any new information relevant to your effort? Is more support needed to increase the audience's proficiency and confidence in the topic? Do you have the capacity to keep working on the topic?
- Reflect on what went well and what you would do differently next time, including formal or informal ways to evaluate your effort. Consider using our **Technical Transfer Reflection Worksheet** to debrief with your team and document your lessons learned to benefit others working on tech transfer.

Supporting documents: [Reflection Worksheet](#)



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Additional Resources

Please consider joining the [Sagebrush Technical Transfer Network](#) for training opportunities, networking, and more. Additionally, we recommend checking out the following resources:

- [Crossing the Chasm: Using Technical Transfer to Bridge Science Production and Management Action](#)
- [USGS Toolkit for Coproducing Actionable Science to Support Public Land Management](#)
- [Becoming an Actionable Scientist: Challenges, Competency, and the Development of Expertise](#)
- [Northwest Climate Adaptation Science Center: Actionable Science webpage](#)
- [A How-to Guide For Coproduction Of Actionable Science](#)
- [Actionable Knowledge For Environmental Decision Making: Broadening The Usability Of Climate Science](#)
- [Assessing Conservation Readiness: The Where, Who, and How of Strategic Conservation in the Sagebrush Biome](#)
- [Adaptive Learner-Centered Education: A Toolkit for Extension](#)



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