

Case Study

Multistakeholder Development of State-and-Transition Models: A Case Study from Northwestern Colorado



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On the Ground

- Engaging multiple stakeholders in building state-and-transition models (STMs) can increase the credibility and relevance they have to land managers.
- Land managers and land stewards may be more likely to use STMs that were developed in collaboration with a broad range of stakeholders.
- The quality of STMs is improved when they are repeatedly revised based on new knowledge from research, multiple interactions with local stakeholders, and ecological field data.

Keywords: collaborative research, state-and-transition models.

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There is often a gap when it comes to translating new scientific knowledge, products, and technologies into action. The implementation of state-and-transition models (STMs) as land management tools by ranchers is no exception. In a 2009 study, nearly 70% of surveyed ranchers did not know about STMs and only 2% used STMs in management.¹ One way to ensure that ranchers and land managers use STMs, and that STMs address the needs of ranchers and land managers, is to repeatedly engage these individuals and groups in building STMs.^{2–4}

The Learning from the Land project began in 2013 with two objectives. We intended to build meaningful STMs that described ecological dynamics and included indicators for sage-grouse (*Centrocercus urophasianus*). We also piloted a STM building process that integrated multiple knowledge

sources including data, research, and local and expert knowledge. Using a framework developed in previous studies,^{5,6} we initiated a cycle of workshops, data collection, and analyses in several project areas to produce STMs over the course of 3 to 4 years (Fig. 1; Table 1). Participants in STM building included local ranchers, Extension agents, natural resource agency staff, and researchers. We expected that participation in STM development would lead to 1) stakeholders who are knowledgeable about STMs and likely to use them, and 2) STMs that are credible, robust, and user-friendly. Here we present a case study to illustrate how we engaged diverse experts in creating STMs. We then reflect on the challenges, benefits, and efficacy of the process in terms of awareness, credibility and application of STMs based on post-workshop surveys and team discussions.

When we started out, we wanted to know which ecological sites were most important to focus on and which were most relevant for land managers in each of the areas we worked in (we worked in 5 project areas. We feature work in one area in this article). To find out, we invited multiple stakeholders (Table 2) to a workshop at which they discussed and decided on priority ecological sites for STM development. We asked workshop participants to consider criteria such as the extent and continuity of ecological sites in their area and their importance for wildlife and grazing. We also asked what past work or research existed about these sites. We left this workshop with two priority ecological sites to focus on in the case study we present here; both dominated by Wyoming big sagebrush (*Artemisia tridentata* subsp. *wyomingensis*).

Developing Generalized STMs with Multiple Stakeholders

How can researchers tap into knowledge people have about landscapes? How can we use this knowledge to identify key unknowns and thus prioritize limited field sampling resources? Once participants selected focal ecological sites, we hosted another workshop locally (less than 1 hour from where

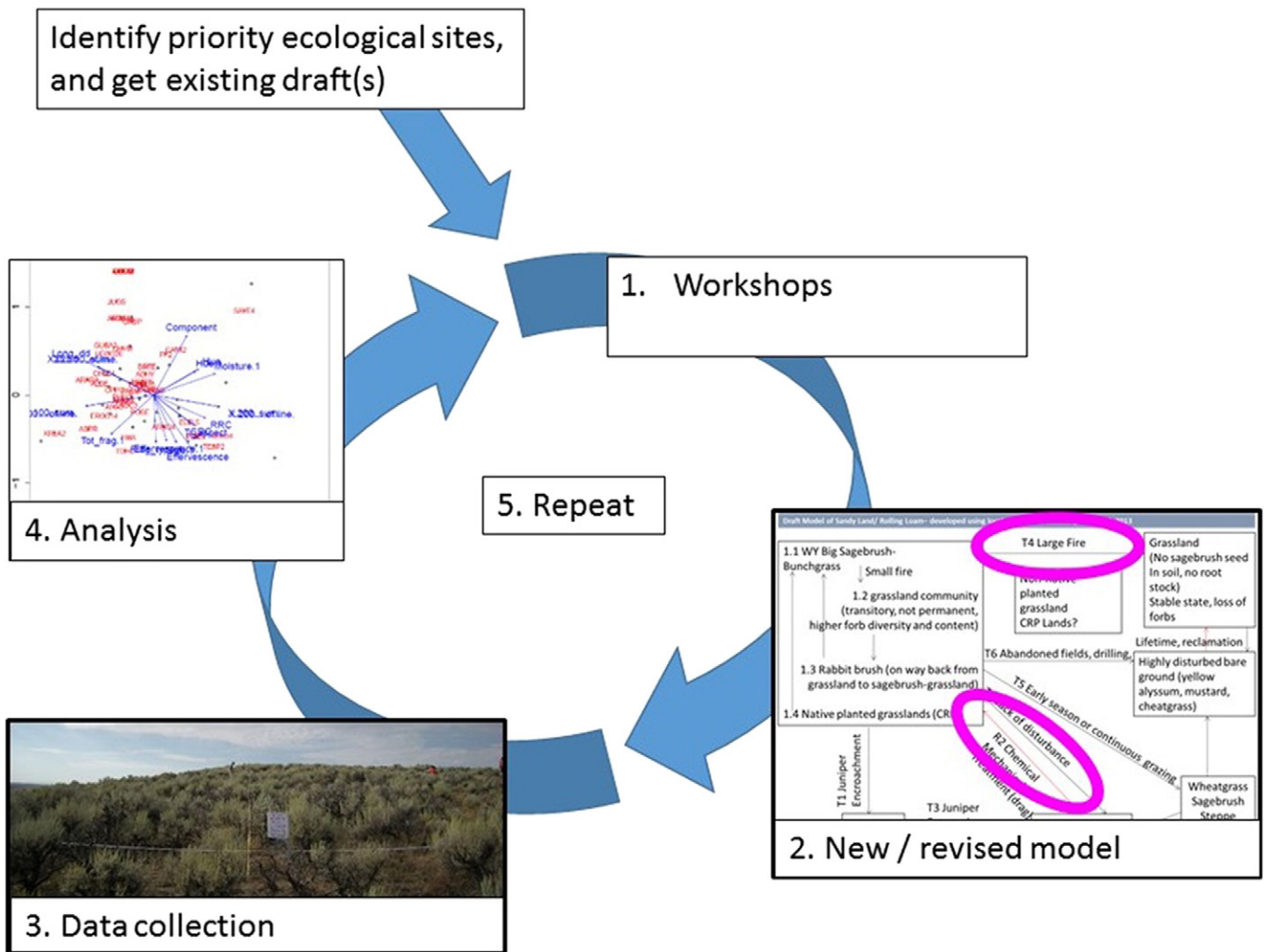


Figure 1. We used a repeated process for revising STMs over time in response to stakeholder input, literature, and data collection. This figure shows the cycles of engagement, followed by data collection, followed by subsequent workshops that we used in creating an STM. We have repeated this cycle three times, with three seasons of data collection and three (going on four) seasons of workshops.

most participants lived) in order to draft an initial STM from which future work would proceed. The attendees included representatives from groups listed in Table 2. In order to contextualize conversations about ecological dynamics on the focal ecological sites, we used STMs from nearby regions with

potentially similar dynamics, or draft models based on research. The workshop followed a similar format as outlined by Knapp et al.⁷ First, we presented STM concepts and terms. We then introduced draft models and broke into small groups to discuss each model (Table 3). Finally, we asked the whole

Table 1. Types and frequency of face-to-face interactions, workshops, and other outreach activities in building one STM in northwest Colorado, 2013-2016

Type of interaction	Number of events	Average no. of participants	Total no. of interactions
Field tour	6	4	24
Individual meeting	6	2	14
Interview with participant	4	2	8
Other local outreach presentation	4	23	90
STM workshop	5	17	85

Note. A final workshop is planned for December 2016.

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