

A Model for Adaptive Management for the Front Range Collaborative Forest Landscape Restoration

The Front Range Collaborative Forest Landscape Restoration Program has developed an adaptive management (AM) model to incorporate data to be developed by its Multiparty Monitoring Program (Clements and Brown 2011) into future goals and treatment actions (Figure 1). The model starts by using this definition of AM from the National Research Council (2004):

Adaptive management promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.

The key feature of AM is that past management actions affect future management direction. However, our model recognizes that in practice there are two potential levels where future directions may be changed through monitoring of past actions. These two levels include changes made either to generally more short-term management treatments or implementation actions, or to generally more long-term and fundamental issues that define project outcomes or even overall desired conditions. We have broadly outlined these differences based on the following definitions (Moote and Shannon 2011):

Implementation monitoring, also known as compliance monitoring, records actions taken and outputs relative to targets. Implementation monitoring asks, "Did we do what we said we would do?"

Effectiveness monitoring measures changes in specific conditions relative to desired outcomes. Effectiveness monitoring asks, "Did we achieve our desired results?"

In the FR CFLRP AM model, implementation monitoring will be done within individual projects, especially within individual NEPA decisions (right-hand loop in Figure 1). Annual monitoring results will be collected, analyzed, and assessed both by agency personnel and collaborative partners to determine if projects are meeting target metrics or other specific objectives defined mainly through NEPA documents. At the same time, both on an annual basis but especially over multiple years of the project, the collaborative will assess effectiveness of the overall CFLRP effort on landscape ecological restoration goals and desired conditions (left-hand loop of Figure 1). Note, however, that there is no hard-and-fast boundary for when these two AM processes take place; a central hallmark of AM is that constant feedback between past actions and future directions is always taking place. If, at any point in the monitoring process, changes need to be made in central tenets of the project's direction, we should be able to accomplish that within the outlines of this model. This is especially the case as new scientific data or other factors become available and may either tweak individual features of treatment options,

or change fundamentally the goals and desired conditions of the overall project (e.g., as an example of the latter, the effects of global climate change).

Finally, the FR AM model also includes a feedback loop for the multiparty monitoring program. If at any point we find that the monitoring plan is not accomplishing the goals set out for it, the plan can be modified or added to. As an example, external research may affect any component of the overall AM process but especially sensitive to external findings may be specific methods or metrics identified in the monitoring plan.

References

Clements, J., and P. M. Brown. 2011. Front Range Roundtable, Collaborative Forest Landscape Restoration Project 2011: Ecological, Social, and Economic Monitoring Plan. Colorado Forest Restoration Institute, available at <http://warnercnr.colostate.edu/images/pictures/upload/cfri/Roundtable-CFLRP-Monitoring-Plan-062511.pdf>.

Moote, A., and P. Shannon. 2011. Multiparty Monitoring and Stewardship Contracting: A Tool for Adaptive Management. Published by Sustainable Northwest, Portland, Oregon; http://www.sustainablenorthwest.org/resources/publications/Multiparty%20Monitoring%20Guidebook%202011_finalV2_links.pdf (accessed Sept 20, 2012).

National Research Council. 2004. Adaptive Management for Water Resources Planning. The National Academies Press. Washington, DC.

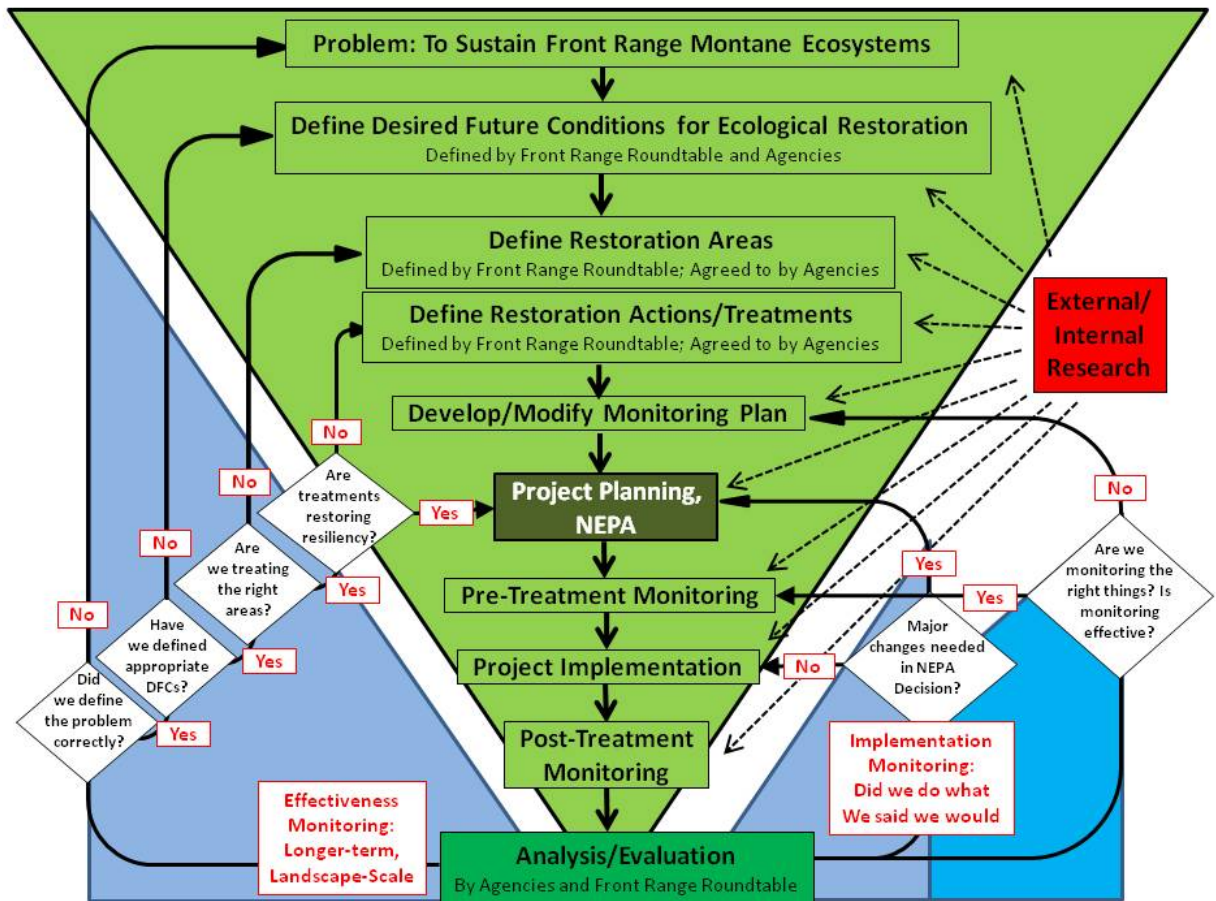


Figure 1. The Front Range Collaborative Forest Landscape Restoration Project Adaptive Management model.