Four Forest Restoration Initiative Treatment Effectiveness Monitoring

Agreement # 15-CS-11030420-018

Prepared for the U.S. Forest Service by
The Nature Conservancy

Suggested Citation:

Woolley, T. 2016. Four Forest Restoration Initiative Treatment Effectiveness Monitoring. The Nature Conservancy. Phoenix, Arizona.

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Project Overview

The Multi-Party Monitoring Board (MPMB) is responsible for executing the Four Forest Restoration Initiative's (4FRI) Effectiveness Monitoring Plan that was developed for the 1st Analysis Area Environmental Impact Statement. The plan's goal was to provide monitoring data at multiple spatial scales for a list of indicators that would provide feedback for adaptive management (Figure 1). A suite of indicators (Final EIS – Appendix E - http://www.fs.usda.gov/main/4fri/planning) related to forest structure, large tree retention, and vegetation composition required field data to monitor changes following mechanical and prescribed fire treatments.

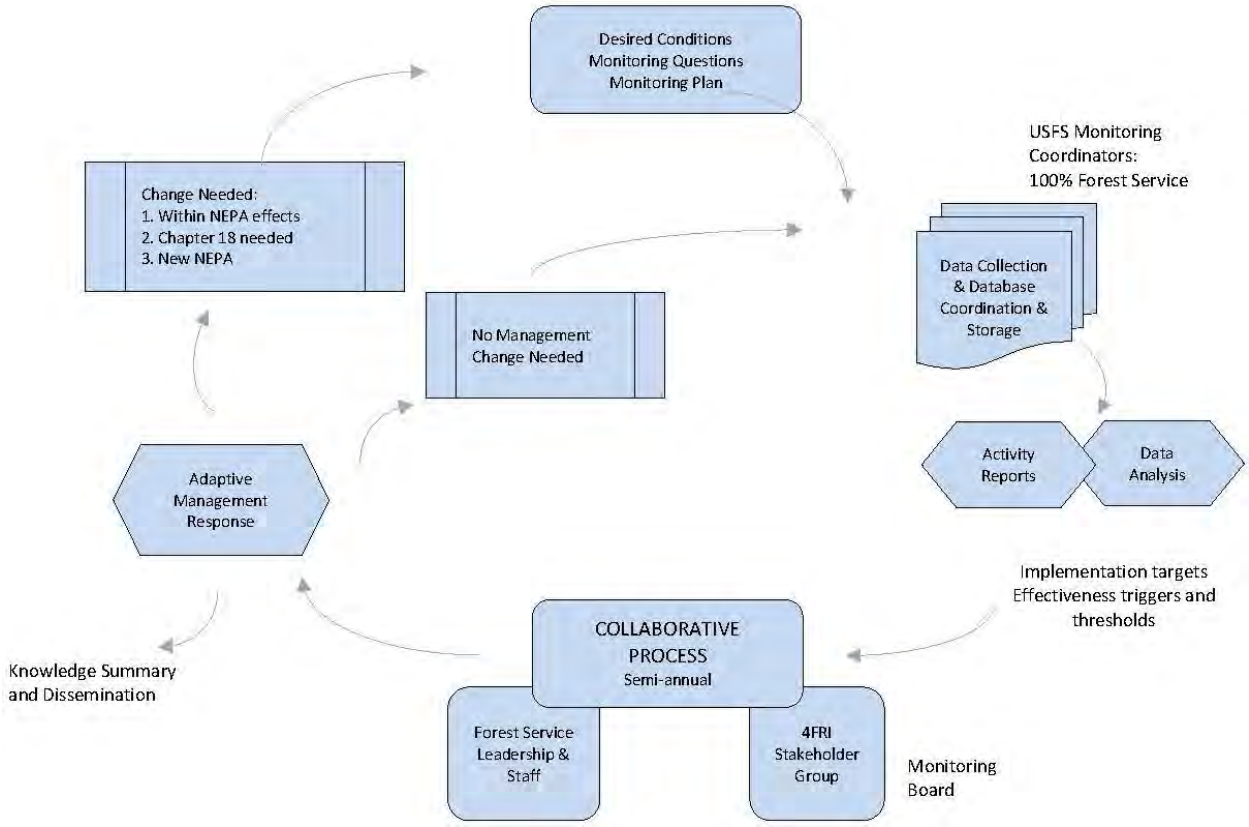


Figure 1 - 4FRI Adaptive Management Process

This data collection effort was used to collect pre-treatment data and to test protocols developed by the MPMB. The selected restoration units (Task Orders) were selected from previously approved NEPA projects that were being implemented under the first phase contract. All available Task Orders were reviewed and compared to 4FRI NEPA prescriptions, desired conditions, and stakeholder developed documents (e.g., Large Tree Retention Strategy and USFS Large Tree Implementation Plan) to ensure that the implementation of the chosen Task Orders would be relevant to Stakeholder derive monitoring indicators.

Data Collection Methods

The Rapid Plot Monitoring Protocol (RPMP) used for data collection was adapted from the Kaibab Rapid Plot protocol (http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5438937.pdf) developed for Kaibab National Forest Plan (http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3791580.pdf) monitoring program. This work is similar to/adapted from Davis et al. 2015 rapid forest assessment methods. The adaptation used in this data collection effort was developed through members of the 4FRI Multi-Party Monitoring Board to provide pre- and post-treatment data to address stakeholder developed monitoring indicators/questions/metrics (Final EIS – Appendix E - http://www.fs.usda.gov/main/4fri/planning). Specifically, the protocol and data collection effort addresses indicators 3-4, 7-10, 24-25, and 30.

The RPMP (Appendix A) guides data collection to assess tree and vegetation structure (trees >4" in diameter at breast height, shrubs, grasses, forbs), ground cover, fuels related structure (dominant fuel model(s), tons of fine fuels, canopy base height), wildlife use, regeneration (trees <4"), disturbance (grazing, fire, mechanical, insects and disease), and presence of invasive plant species (http://www.fs.fed.us/database/feis/plants/index.html).

The four Task Orders chosen for plot installation and measurement (Wing Mountain East, Hart Prairie, Hochderffer, and Clint's Well) were gridded with a potential plot network using GIS software (200 x 200 m spacing). A subset of plots was randomly selected for measurement, using a 1 plot/50 acres rule of thumb. All plot locations were permanently monumented with a small metal pin buried at plot center with a tag indicating Task order and Plot #. A reference tree was tagged below stump height to help relocate plot centers. A sub-meter UTM coordinate was taken at each plot center, and coordinates were corrected using Pathfinder Office software.

Plot inspections were performed by both The Nature Conservancy (TNC) and the U.S. Forest Service (USFS) individually and collectively. TNC inspected two plots and the USFS inspected four plots (two TNC inspected plots and 2 previously un-inspected plots) early in the data collection process. Several issues with "in/out" trees were identified and crews re-measured these plots. Subsequently, TNC and USFS co-inspected three plots and found no accuracy issues with any of the data collected.

Data Collection Results

Data using the RPM protocol was collected across; 55 plots in the Wing Mountain East Task Order (52 plots selected for measurement), 43 plots in the Hart Prairie Task Order (35 plots selected for measurement), 63 plots in the Hochderffer Task Order (60 selected for measurement), and 128 plots in the Clint's Well Task order (128 selected for measurement).

Overview of Deliverables

In addition to this summary report describing methods of the work, several deliverables are attached (Appendices) or will be delivered electronically or by hand. Attached to this report you will find the Final RPMP Protocol that was used for data collection (Appendix A). Delivered electronically is a list of plots that were not measured (plot center fell on road, etc.) for each Task Order and replacement/additional plots measured, a list of UTM coordinates for each measured plot, digital photographs of each plot and the .im file containing the data that was entered into PC Exams software will be hand delivered to the 4FRI monitoring coordinator.

In addition, a protocol document with track changes and comments representing crew feedback will be delivered electronically to the 4FRI Monitoring Coordinator to clarify measurement approaches. The implementation of this protocol also resulted in many changes to the variables measured (some altered, some removed from future data collection efforts) as well as the sampling design for future monitoring efforts. This information resides within the MPMB records.

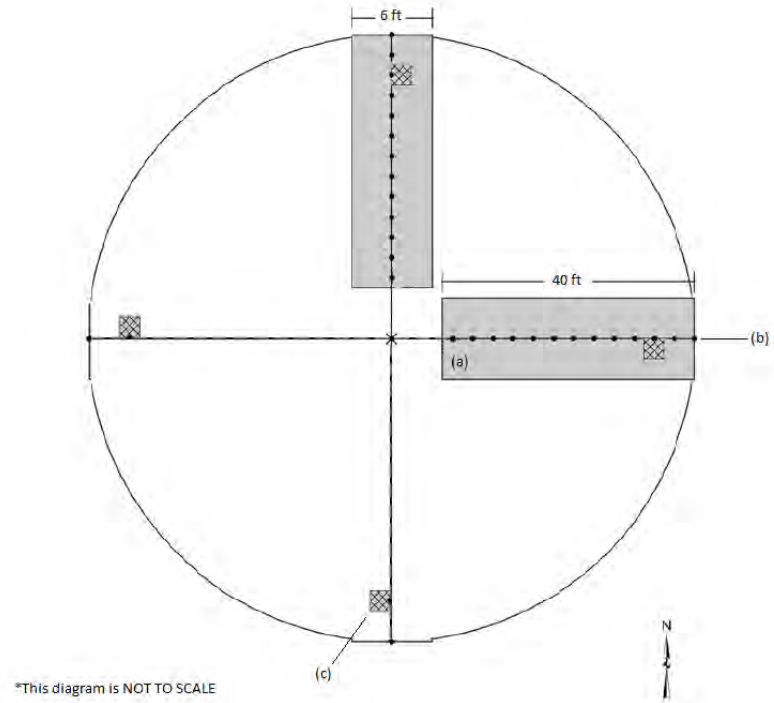
Appendices (Deliverables)

Appendix A

4FRI MPMB Ground Plot Protocol

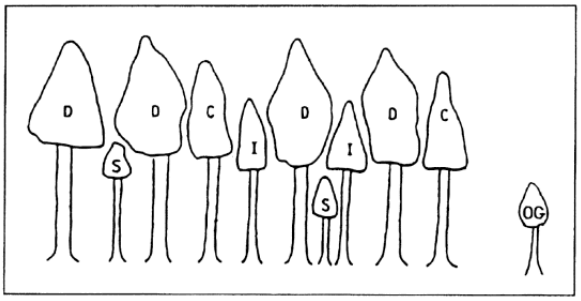
0. Set up plot (50ft radius circle, 7853.98 sq ft, 0.18 acre)
    a. Lay out two 100ft tapes, one N-S, one E-W (tapes cross at plot center at the 50ft mark)
1. Fill out top of data sheet
    a. Note start time
    b. Date, names of data collectors, plot, task order, forest
    c. GPS - UTM Easting and Northing
        i. Datum: NAD83, DO NOT CHANGE
    d. Reference tree – pick the largest tree on or near to the plot center
        i. Record species, DBH in inches, distance in feet & azimuth from tree to plot center on data sheet
        ii. Record plot #, distance in feet & azimuth from tree to plot center on tree tag
        iii. Tag tree at stump height
    e. Stake at plot center with tag (plot #)
    f. Take pictures – North to plot center, East to plot center, photos should show ground and plot. Use white board to record plot number in pictures. Record photo numbers on data sheet.
2. Tree sampling
    a. Use tape to measure dbh of every tree ≥ 4” dbh. Record species, DBH, live/dead. Start in NE quadrant.
        i. Measure height of 3 co-dominant trees (average large trees). Tag trees at breast height, labeled 1, 2, and 3 with Plot Name and #.

        ii. Measure CBH of three trees with lowest canopy height ≥ 4" dbh. CBH is the lowest piece of live vegetation on the lowest branch. (these trees are not tagged)
        iii. Trees on plot edge are "in" if the center of the tree is 50 ft from plot center.
        iv. If a tree forks below BH, measure and record dbh as two separate trees. If forks above BH, measure as one tree.
        v. For species that fork/branch multiple times below BH, measure/estimate DRC.
    b. Snags >4" and taller than 4.5 ft.
    c. Count number of seedlings (< BH) and saplings (≥BH and <4" DBH) in two 40 ft x 6 ft transects. One transect NS, one EW. Transects start 10 ft from plot center (see plot diagram, (a))
        i. If seedlings are too numerous to count/in dense areas, estimate to the nearest 50.
        ii. If transect is blocked, move clockwise.
3. Ground cover sampling – two 40 ft transects, one NS, one EW. Transects start 10 ft from plot center (see plot diagram (b))
    a. Record functional group/life form every 2 ft for the 40 ft transect, starting from tallest to shortest.
    b. Don't double count functional groups, unless ground intercept is same as canopy functional group (ground intercept can be basal stem of vegetation). Record ground intercept last, in shaded column.
4. Fuels (see fuel model supplement page) – estimate only looking at the plot, not the surrounding forest.
    a. Estimate fine fuels – is the fuel load < 3 tons/acre (see picture), between 3 and 10 tons/acre, or > 10 tons/acre?
    b. Estimate plot fuel model (choose up to 2)
5. Disturbance sampling
    a. Record presence or absence of:
        i. Invasive species (see most wanted list)
        ii. Soil disturbance (erosion, rutting, landings, old roads, etc)
        iii. Grazing (presence of cow pies, cattle trail)
        iv. Fire (surface fire, lightning strike, severe fire)
        v. Insect/pathogen (pitch tubes, mistletoe, woodpecker holes, defoliation)
6. Small mammal sampling (see small mammal sampling supplement):
    a. Vole runways
    b. Squirrel sign:
        i. Circle observation range for twigs/clips and for cones
        ii. Circle other signs observed



Crown Position Classes: D = dominant, C = codominant, I = intermediate, S = suppressed, OG = open–grown.

The dominance of a tree refers to the position of its crown relative to other trees in the canopy. Dominant trees have relatively large crowns and are taller than most other trees in the stand. Co-dominant trees make up the general canopy level.



<u>Equipment List</u>

- D-tapes (English)
- 2x 100 ft tapes
- Hypsometer
- Camera
- GPS
- tags
- Flagging
- Chaining pins
- Garden stakes
- Hammer
- Chalk
- Invasive, mammal, fuel guides
- Clipboard/tatum

Literature Cited

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