**Post-fire regeneration revisits of the Common Stand Exam (CSE) post-fire plots: protocol notes**

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Contacts: Derek Young, UC Davis, [djyoung@ucdavis.edu](mailto:djyoung@ucdavis.edu)

Andrew Latimer, UC Davis, [amlatimer@ucdavis.edu](mailto:amlatimer@ucdavis.edu)

Claire Tortorelli, UC Davis, [ctortorelli@ucdavis.edu](mailto:ctortorelli@ucdavis.edu)

**This protocol was modified from the Forest Service CSE plot protocol.** CSE plots are standard Forest Service plots used to collect data on trees, vegetation composition, ground surface cover, and down woody material/fuels. Complete information on the full CSE protocol, use of field data recorders, and the FSVEG database, can be found at <http://www.fs.fed.us/emc/nris/products/fsveg/>

**Plot location:** Relocate rebar with plastic cap from original CSE survey using coordinates. Witness trees and/or flagging tape may be present. If rebar cannot be located, skip plot. These may be sampled later as “non-permanently marked” plots.

**Skipping a plot:** If a plot is skipped, start datasheet for plot. Record rationale for skipping plot in notes and take photos if possible (e.g. rebar was not located, evidence of intensive management (logging/planting) inside of plot, plot cannot be safely accessed).

**Plot set up:** Circular. Set up two 50 m tapes crossing the center point along the cardinal directions, put pin flags at 11.3 m from center (405 sq m plot) and 4.37 m from center (60 sq m regen plot).

**Logistics:** Depending on the terrain and the complexity of the vegetation, you will accomplish usually between one and four CSE revisit plots per day.

Plot data:

1. Enter the plot #, date, and recorder/observer initials
2. Record whether the rebar was relocated
3. Take new GPS point at plot center (plot # followed by “R”)
4. Take photo of plot # and from the S terminus (11.3 m from plot center) of the N-S tape, looking N
   1. Enter photo number & camera name if different than field phone

Cover:

1. Veg cover: estimate % **live** foliar cover of the total plot and modal height (in meters) for veg cover (can sum to >100)
   1. “% cover” is the cover of living vegetation as a % of the plot when viewed from above (including gaps smaller than the observer’s shoe).
      1. Dead forbs and graminoids should be counted as live cover if they are still standing and biomass appears to be from this season
   2. Modal height is the most common height, which is not always the average
   3. “% annual” is the percent of the cover of each lifeform that is composed of annuals (vs. perennials). Only record this if the lifeform cover is 1% or greater.
   4. “Live understory trees” are those believed to be established post-fire
2. Ground surface cover values must sum to 100%
   1. These measures are of the ground cover, i.e. think about what the plot would look like if you could cut all plants off right at ground level
      1. **Bark is always counted as litter**
3. Shrub cover at total plot scale & regen plot scales
   1. Record cover of all shrub species (excluding hardwood tree species) that occur at >= 10% cover **and all hardwood species that occur at >= 1% cover**
   2. Density includes dead shrub material and can be recorded as low (ground is easily seen through shrub biomass), moderate, or high (ground is nearly completely obscured by shrub)
   3. “% dead” cover and biomass is recorded as the amount of cover and biomass of the total shrub cover for each species that is dead
4. Invasive species
   1. Record cover of all non-native species that occur at >5% cover in the total plot
   2. Always record BRTE (cheatgrass) cover

Seed Tree:

1. Record nearest distance to all potential seed tree species
   1. Record distance to nearest post-fire tree and pre-fire trees for hardwoods greater than 2m high or with visible acorns and conifers greater than 5m
   2. “Line of sight”: record shortest distance at which trees beyond cannot be seen
   3. “Dist > 5 trees”: record distance to nearest cluster of >5 trees (conifers) where gaps between trees do not exceed the canopy width

Fine fuels:

1. Fuels data will be collected from four Brown’s Transects (J.K. Brown. 1974. Handbook for inventorying downed woody material. USDA Forest Service Intermountain Research Station General Technical Report INT-16). The transects are laid out at the cardinal directions, stretching from the plot center to 37’ (11.3 m). The ends of the transects are the starting points, i.e. they are read starting from at the edge of the plot, heading toward the middle.
2. Enter the azimuth of the transect. “N” means that it is starting from the N side and going S, etc. Start with the S and E transects. If the S and E fuels transects appear representative of the entire plot, the N and W transects can be skipped.
3. Measure the 1 hour (diameter = 0 to 0.25” or 0-0.64 cm) and 10 hour (0.25” to 1” or 0.64-2.5 cm) fuels along the first 2m of the transect, and measure the 100 hour (1-3” or 2.5-7.6 cm) fuels along the first 4m. Tally the number of hits for each fuel class.
4. Measure litter and duff depths at 11.3m and again at 7.3.
   1. Litter is undecomposed or only partially decomposed organic material that can be readily identified (e.g., plant leaves, needles, twigs, etc.).
   2. Duff is between the litter and mineral soil, and includes decomposing organic material, decomposed to the point that there are no clearly identifiable organic materials like pine needles, leaves, twigs, etc., although larger decomposing tree branches etc. can sometimes be found in duff.
5. Measure fuel depth for three contiguous 30-cm segments starting at 11.3 m. Along each of these 30 cm segments, find the highest dead fuel not attached to a rooted plant in that segment, and measure the height between the bottom of the litter layer (top of duff) to that branch or needle or stick, etc. Record the three measurements.
6. Measure coarse woody debris (>7.6cm or 3”) along the entire transect:
   1. Only measure each piece of CWD once even if it crosses the transect in multiple locations
   2. Enter the diameter of the CWD at the transect intersect
   3. Enter the decay class (Sound or Rotten)

Regen data form:

General data (regen plot scale):

1. Enter the plot number, date, and last names of the observers
2. Enter number of tree data forms filled out
3. Record ground cover and shrub cover for the regen plot as described above
   1. Additionally, record live and dead overstory (pre-fire) and understory (post-fire) tree cover
   2. Record hardwood and conifer cover separately

Individual regenerating trees (live) within regen plot:

1. Enter species
2. Record if the tree is over, marginal with, or under neighboring vegetation
3. Enter dbh if >1.4 m tall
4. Enter height (cm)
5. Enter last year height (straight line measurement from base to last year bud scar)
6. Enter last year growth (from last year bud scar to apical meristem – not including needle height)
7. Count number of bud scars (\*not for CADE or hardwoods)
8. Count number of sprouts for hardwoods – record if burned skeleton of pre-fire tree is present in comments
9. Tally if greater than 10 seedlings for each species/age class (best estimate) - record height of tallest regen
10. Tally number of dead recruits by species

All emerging recruits (for 405 m2 plot):

1. Count number of emerging recruits by tree species and height class (<10cm, 10-50cm, 50-200cm, and >200cm). **Exclude trees counted in the regen plot!**
   1. “Emerging trees” are recruits that would be easily visible from above (i.e. not under surrounding vegetation

**Updates/reminders for crew (details above):**

* Include species specific hardwood cover estimates at the plot level
* Twigs & bark count for litter depth
* Record if burned skeleton of resprouting pre-fire hardwood is present in comments
* For plots skipped, start a datasheet for that plot
* Note if you see cones/acorns on post-fire trees