Figure 1. Map of study area. Fire frequency-elevation relations were evaluated primarily in Mormon Canyon. The role of fire in mixed-conifer forest were examined in the high country between Flys and Chiricahua Peaks. Hatched areas represent bare rock.
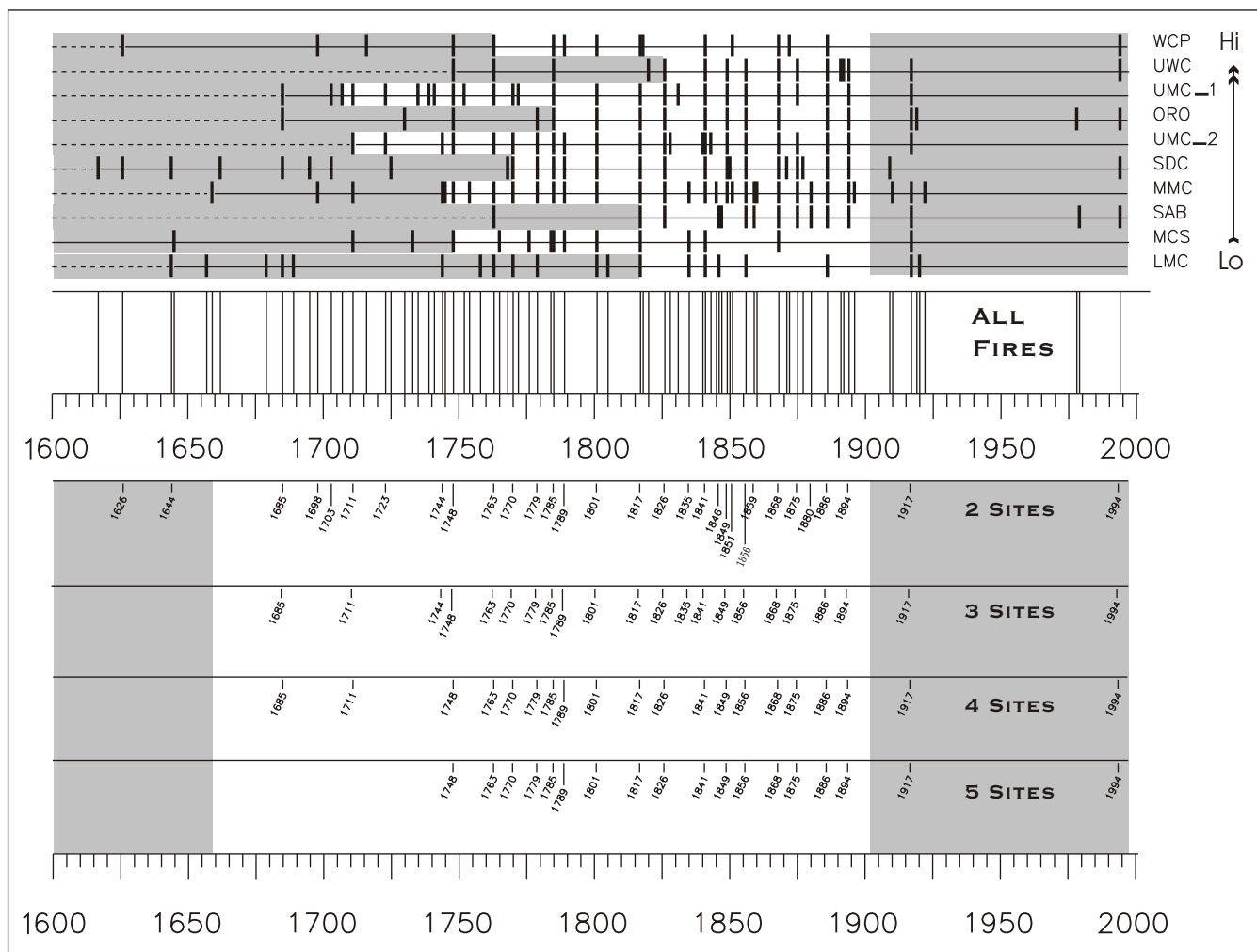
Figure 2. Elevation transect fire history chart. In the upper portion of the graph, horizontal lines represent individual sites and vertical bars represent fire years. The "bar code" feature illustrates the temporal pattern of all fires recorded in the elevation transect. Horizontal lines in the bottom portion of the graph are composite fire histories for fires recorded by successively larger numbers of sites. Unshaded portions highlight the Period of Analysis for single and multi-site fires (see Methods).
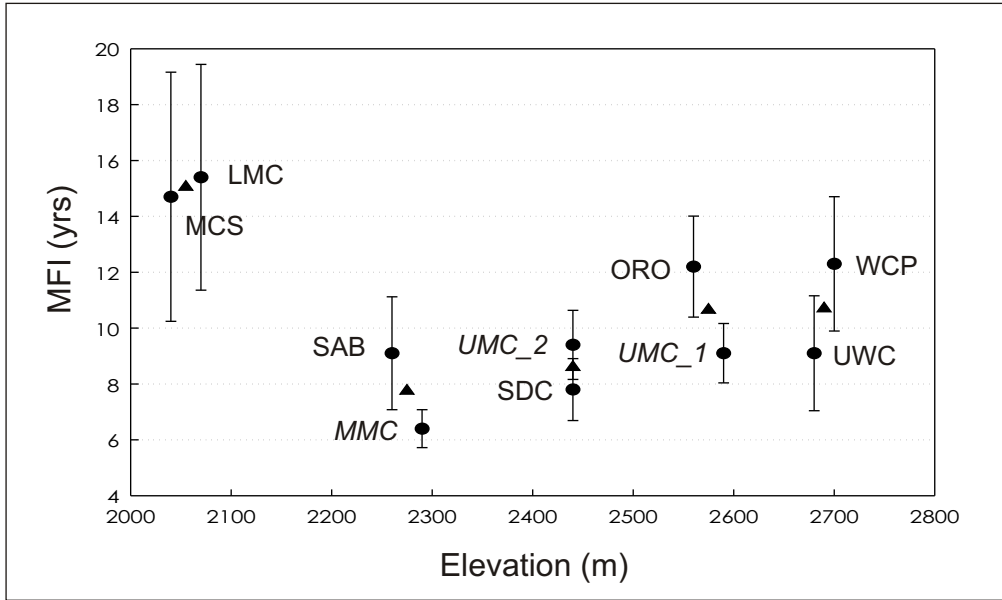
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Figure 3. MFI plotted against elevation. Bars indicate one standard error. Triangles are positioned at mean elevation and MFI for each site pair. Italics denote lower-slope sites.
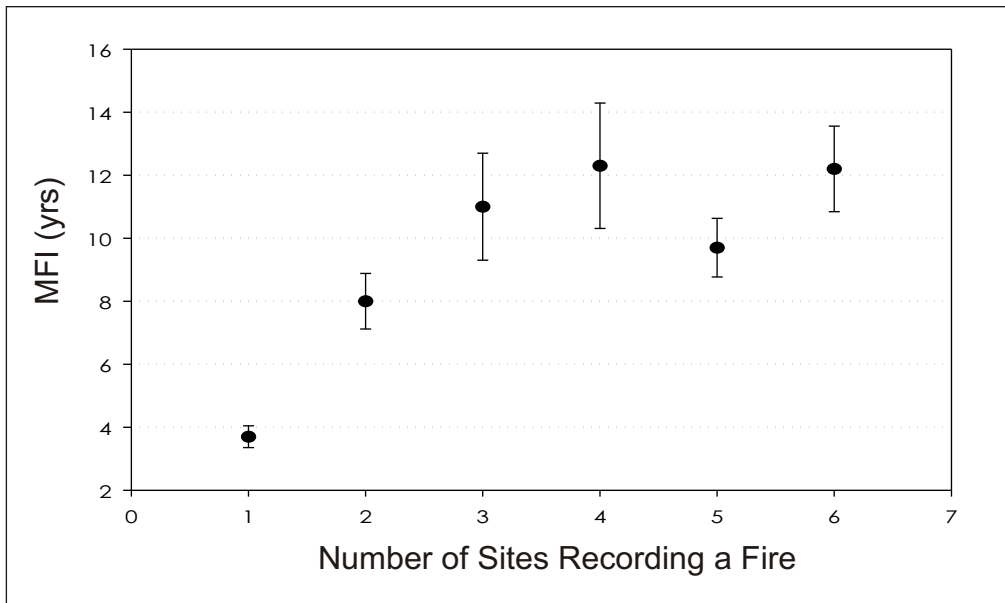

Figure 4. MFI stratified by number of sites recording a fire along the elevation transect. Bars indicate one standard error.
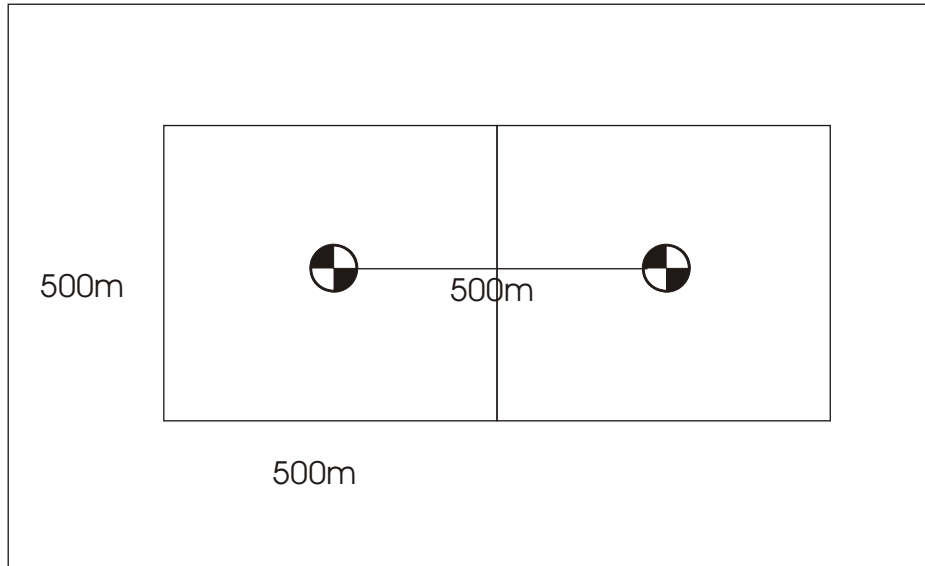
14

Figure 5. A simple model to illustrate the "widespread-fire" threshold size. Sites are assumed to be the center point of a square-shaped, homogeneous (same fire history throughout) area. The average approximate distance between adjacent sites in Mormon Canyon is 500m. Therefore, each site represents an area of 500x500m, or 25ha. Results suggest that when fire attains a size such that two sites record the event, there is a higher probability of the fire spreading throughout the canyon. A fire that ignites within one site area will, by definition, spread throughout it, growing to a size of 25ha. If the fire burns into the adjacent site area, it will again, by definition, spread throughout. Therefore, this fire, to be recorded in two sites, needs only to exceed a size of 25ha. This model is unrealistic on many counts, for example, fire history sites are not linearly arranged and topographic features that affect fire behavior are not incorporated; nevertheless, it provides a basis for conceptualizing fire size
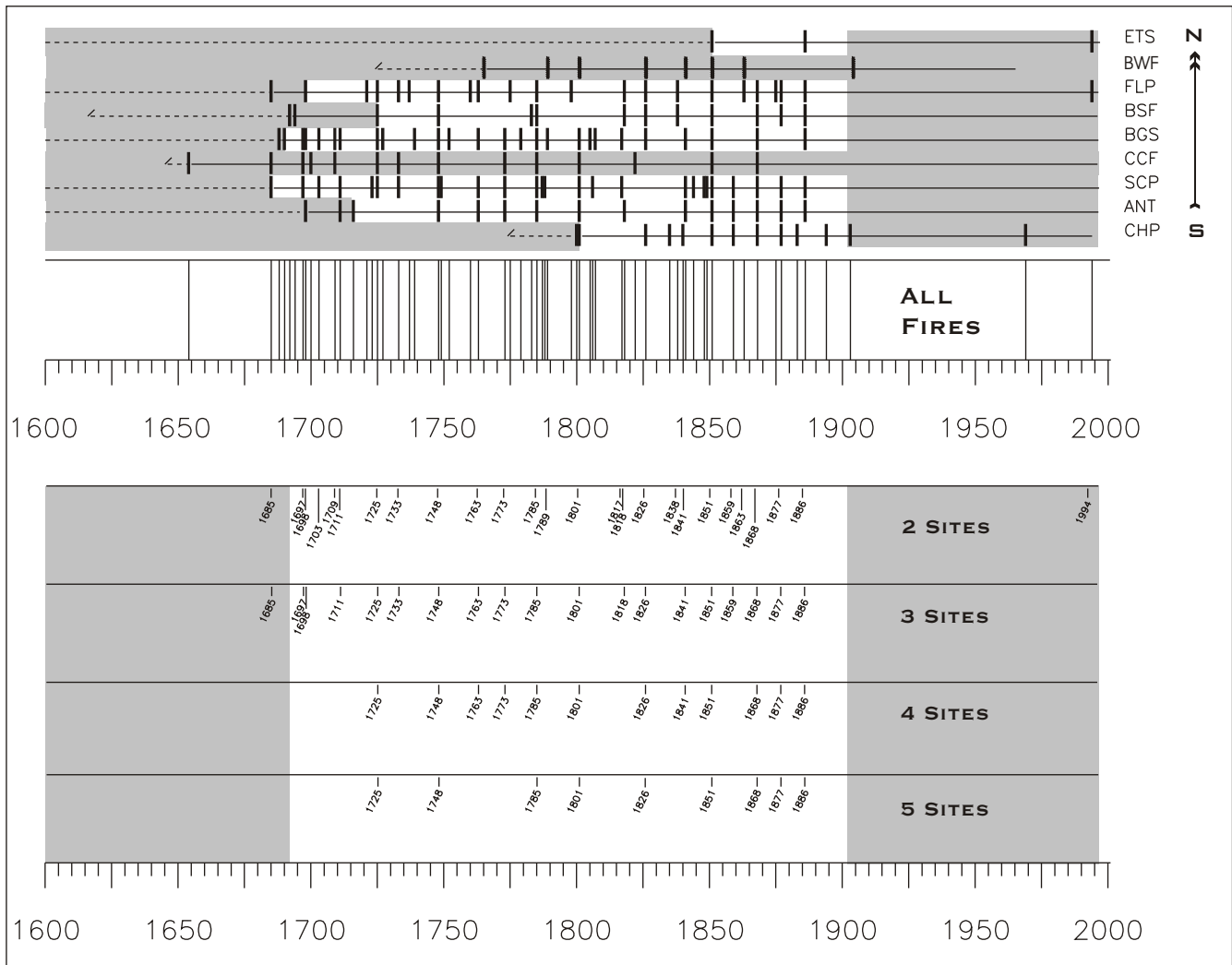
16

Figure 6. Fire history chart for mixed-conifer forest sites. In the upper portion of the graph, horizontal lines represent site composites and vertical bars represent fire years. The "bar code" feature in the center illustrates the temporal pattern of all fires recorded throughout the study area. The bottom portion of the graph are composite records of fires recorded by successively larger numbers of sites. Unshaded portions highlight the Period of Analysis for single and multi-site fires (see Methods).
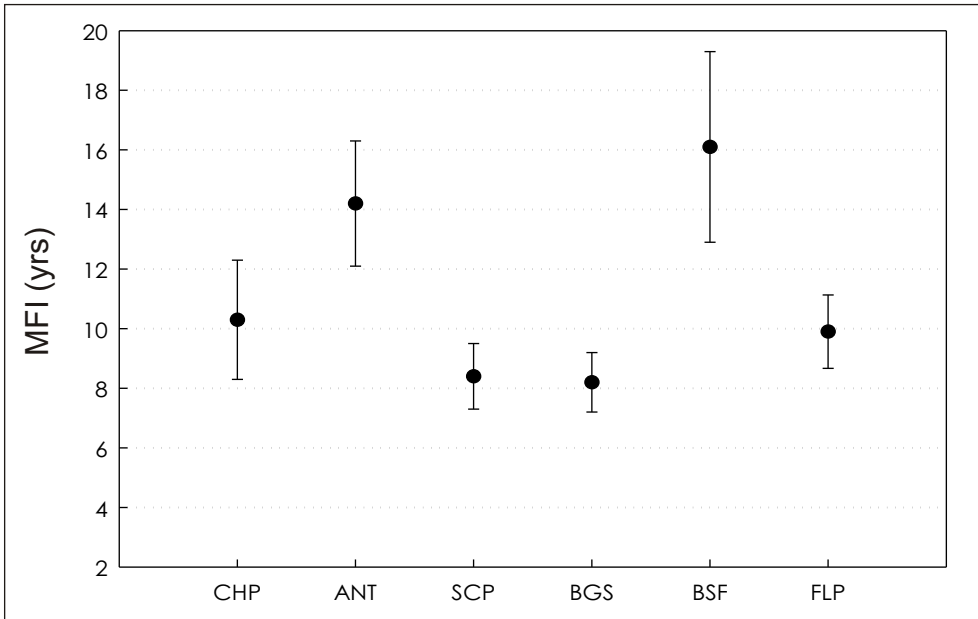
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Figure 7. MFI for mixed-conifer fire history sites. Bars indicate one standard error.
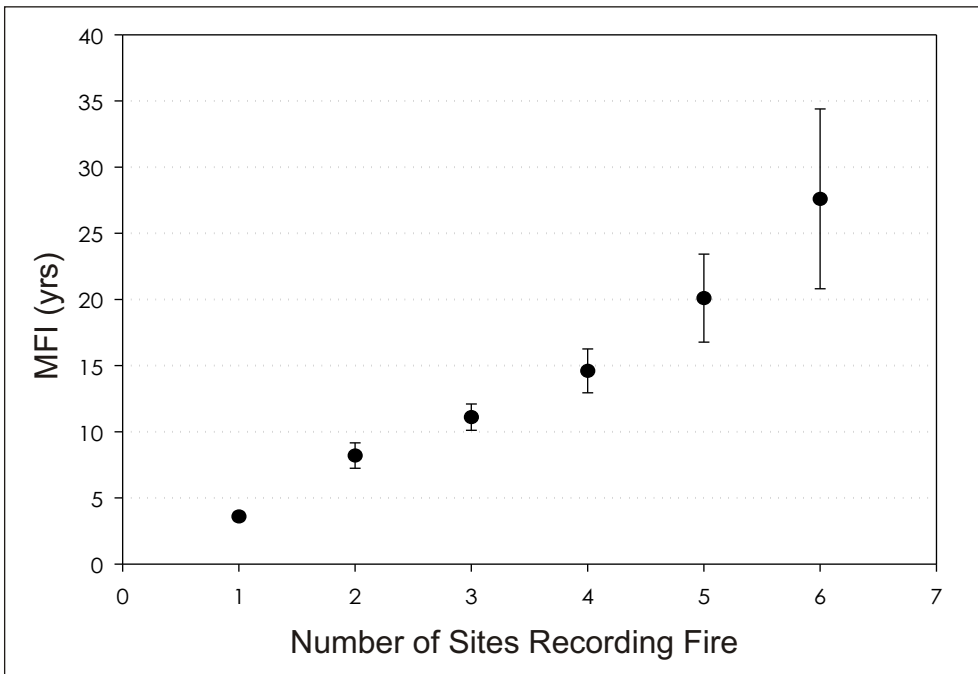

Figure 8. MFI stratified by number of sites recording a fire in mixed-conifer forest. Bars indicated one standard error.
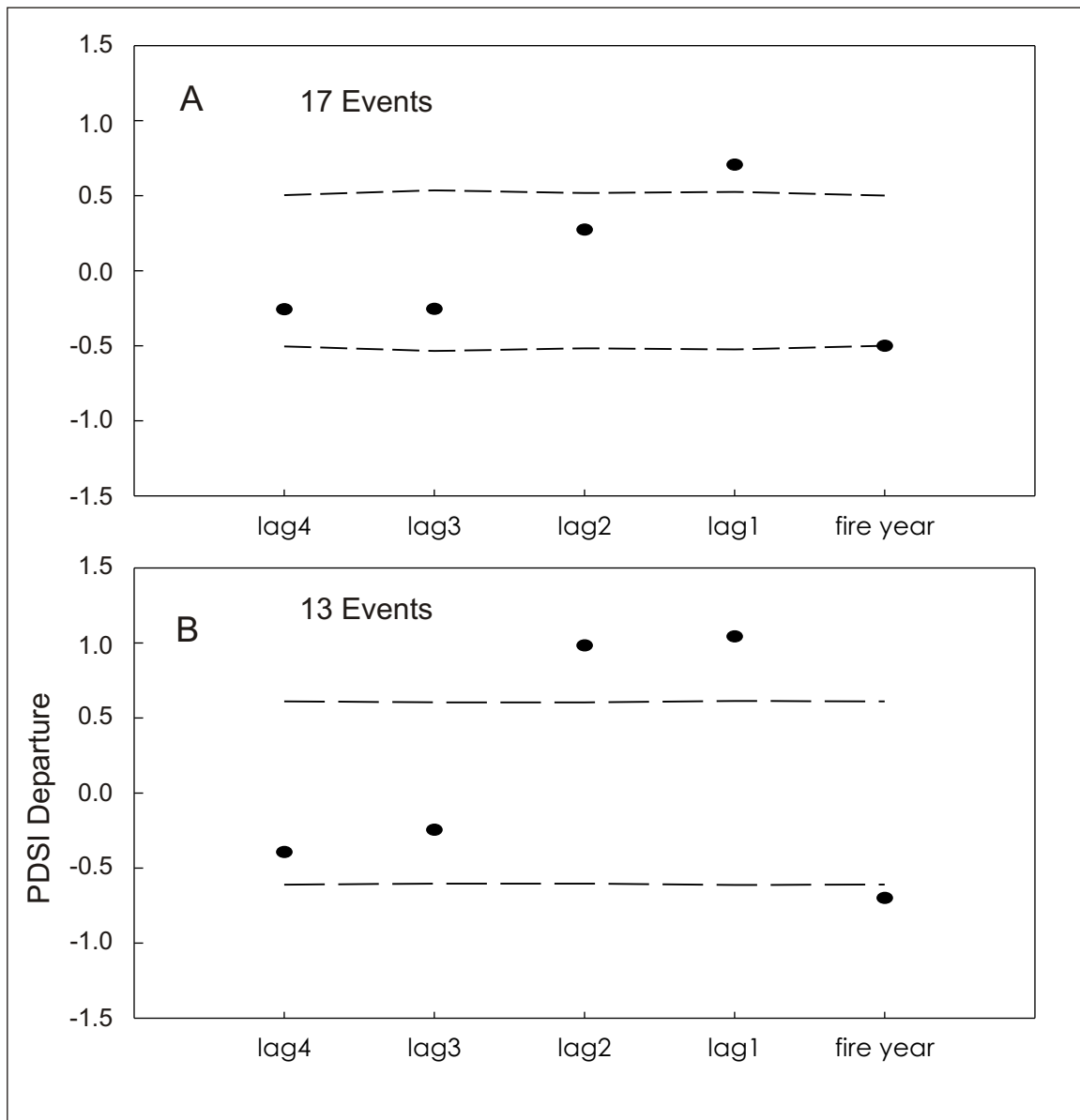
Figure 9. Associations between inter-annual PDSI values and widespread fires (occurring in at least four sites) for A. Elevation transect and B. Mixed-conifer forest. Positive departures are wetter-than-average conditions and negative departures are drier-than-averge conditions. Dashed lines represent 95% confidence intervals.
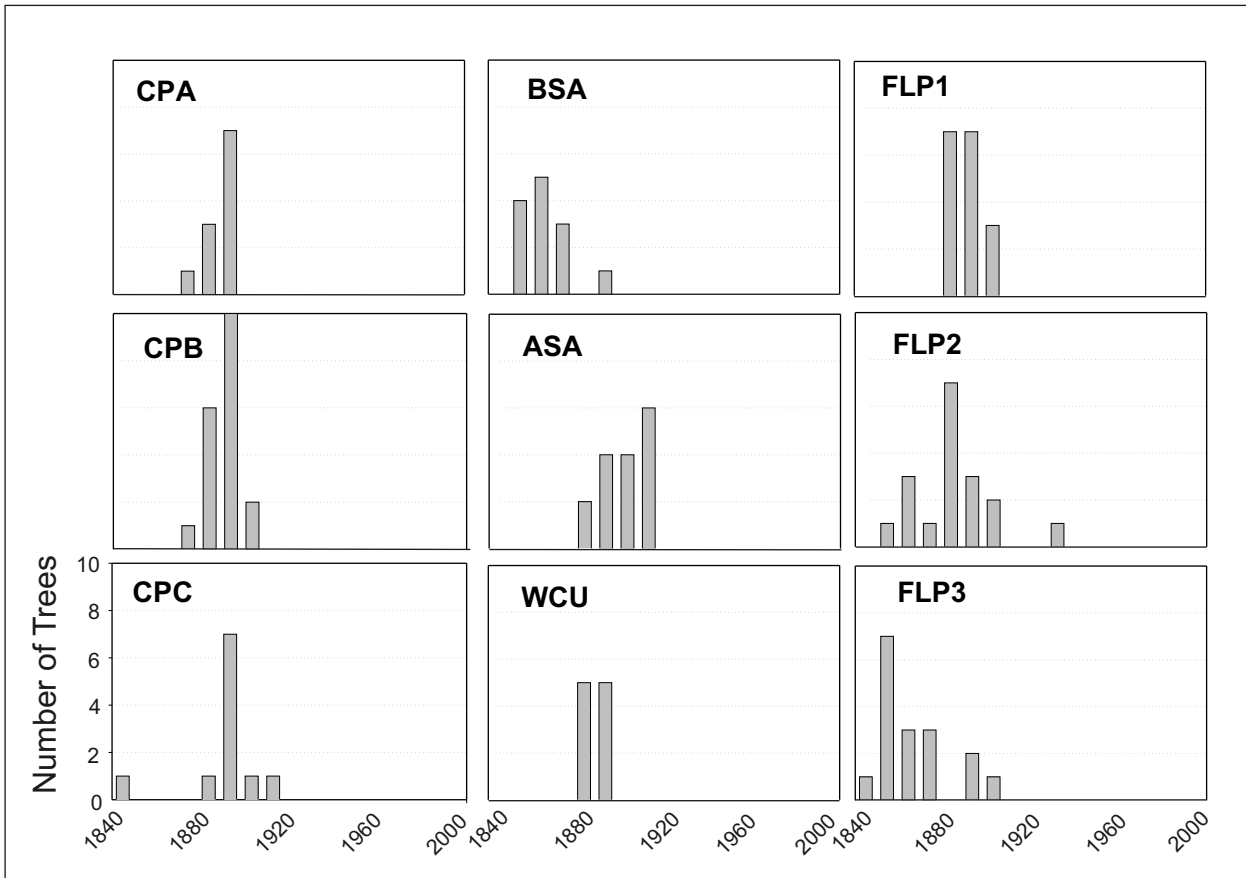
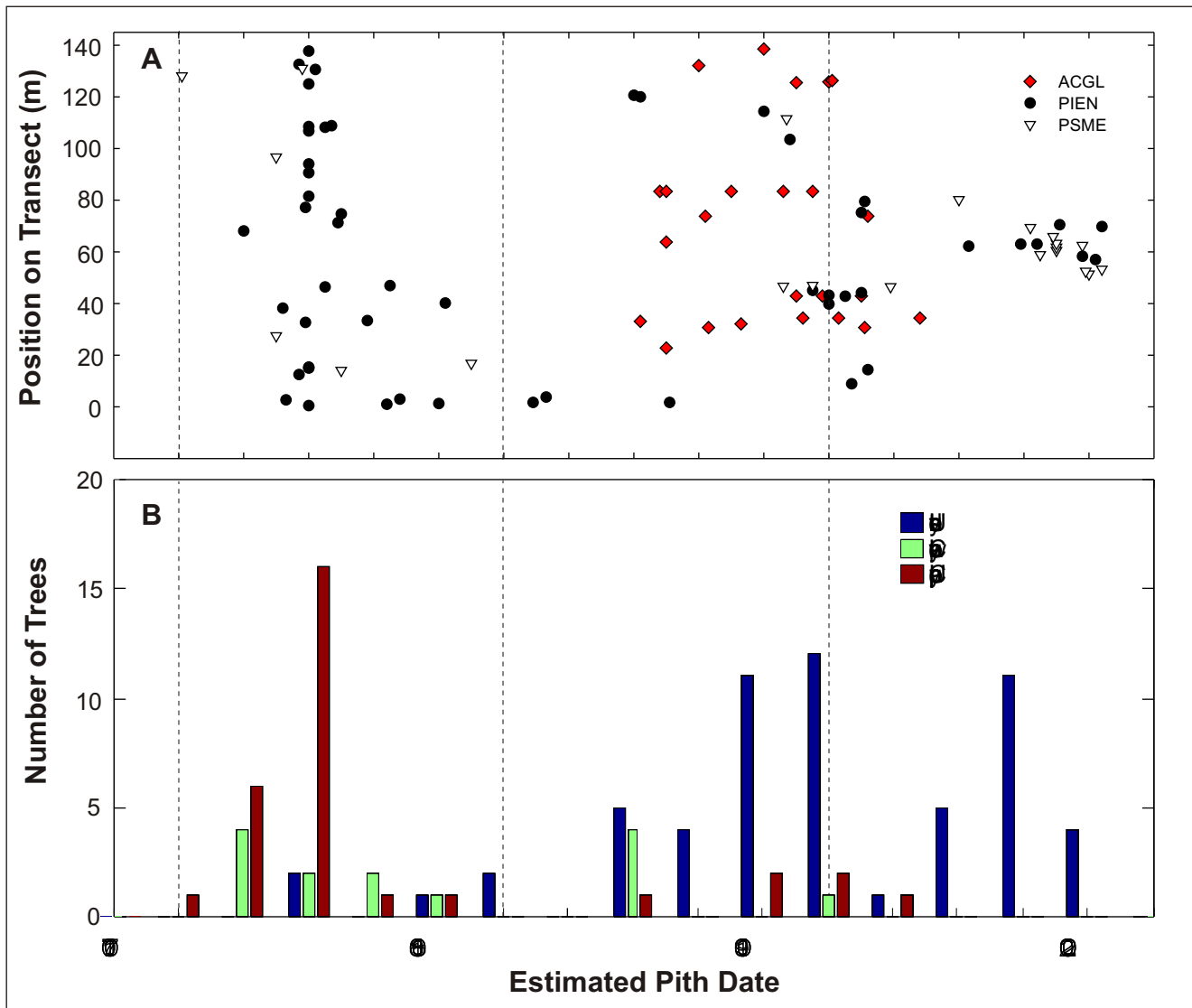**Figure 10.** Estimated pith dates for monospecific aspen stands.

Figure 11. Lower Cima Ridge (LCR). A. Estimated pith dates and unidimensional location data of trees found on the transect. B. Estimated pith dates by 10-year classes for upper canopy (dominant and co-dominant), lower canopy (sub-dominant), and understory trees.
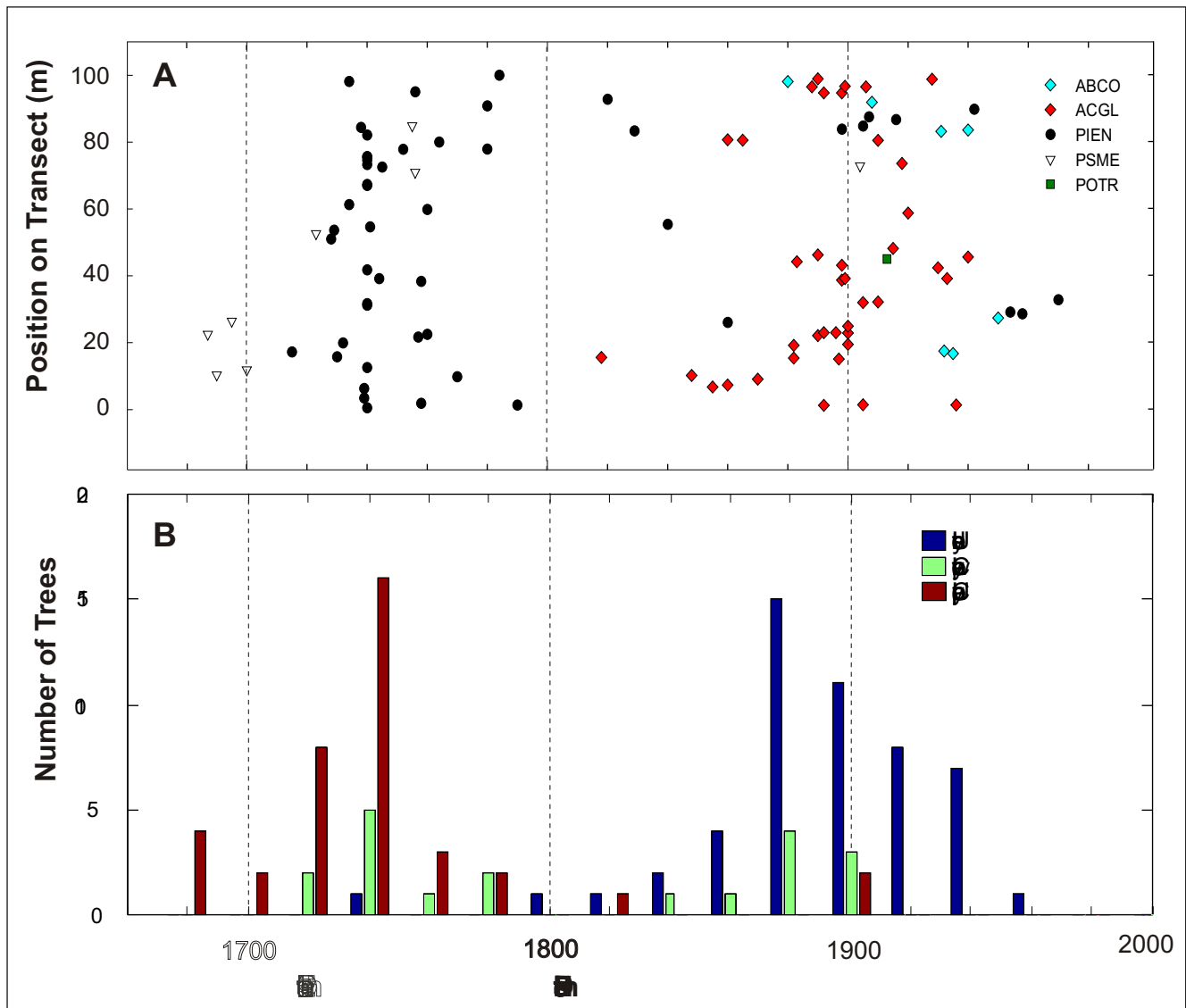
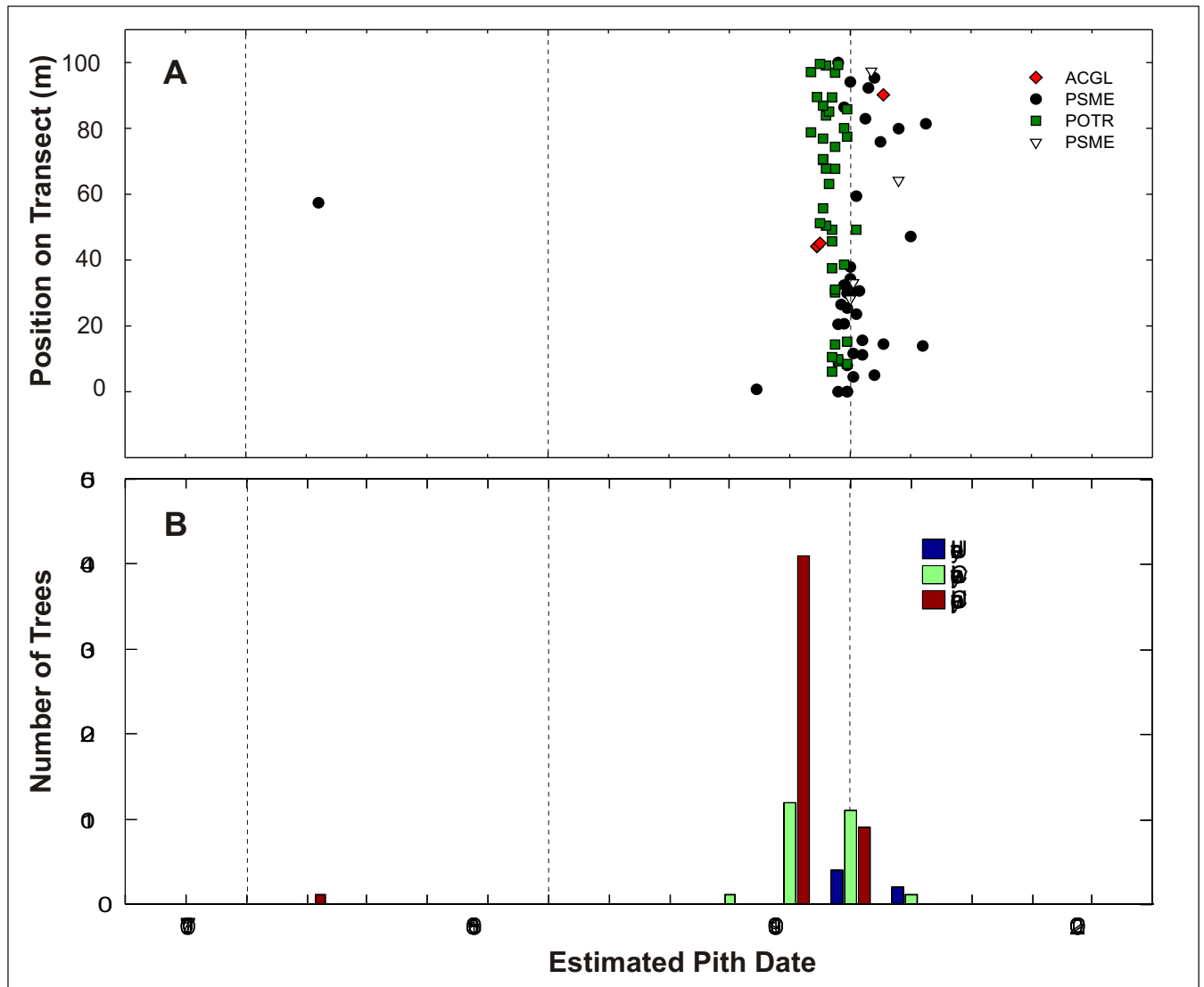**Figure 12**. Lower Booger Springs (LBS). See Figure 10 for caption.

Figure 13. Upper Cima Ridge (UCR). See Figure 10 for caption.

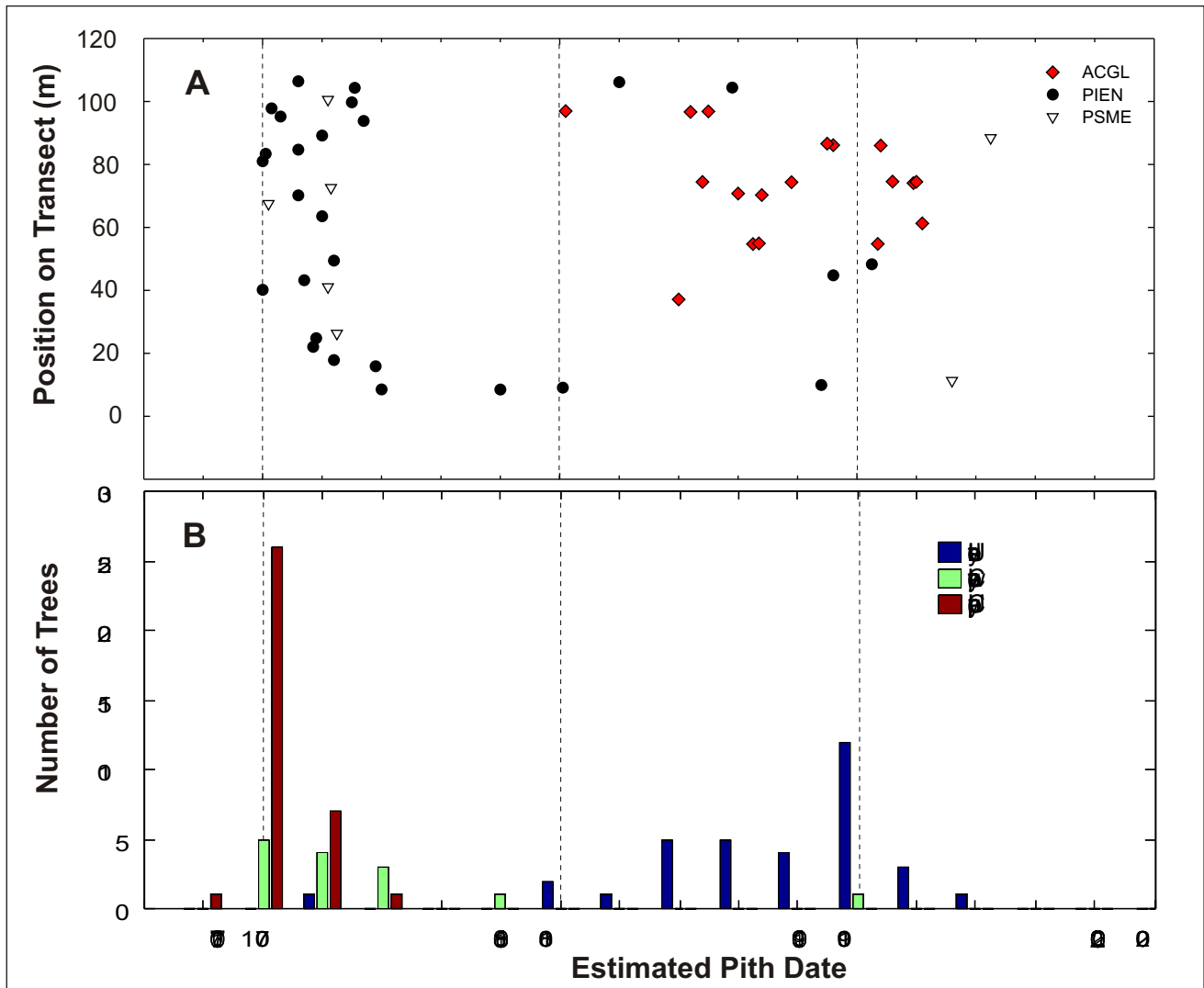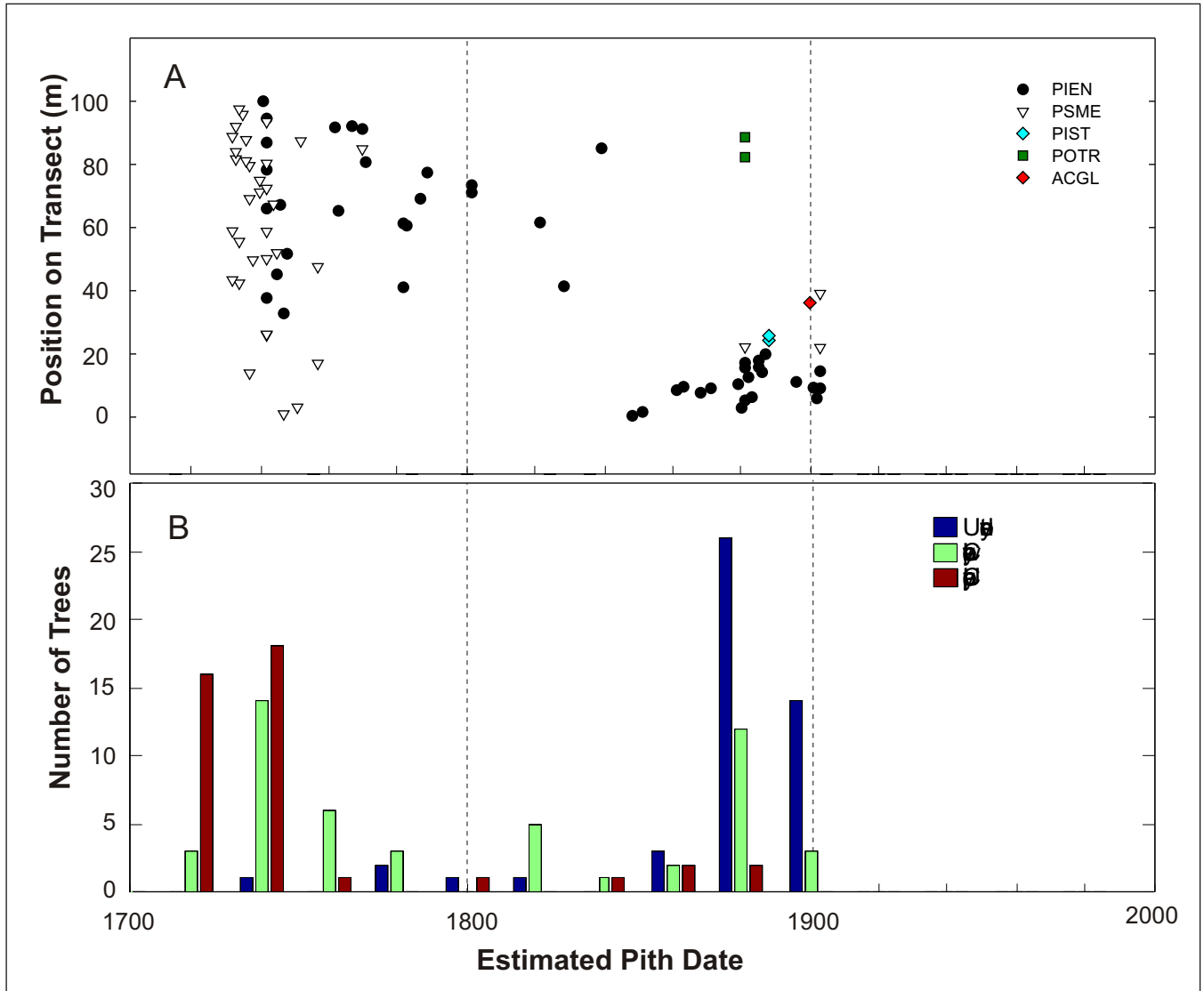**Figure 14**. Middle Cima Ridge (MCR). See Figure 10 for caption.

Figure 15. Upper Booger Spring (UBS). See Figure 10 for caption.
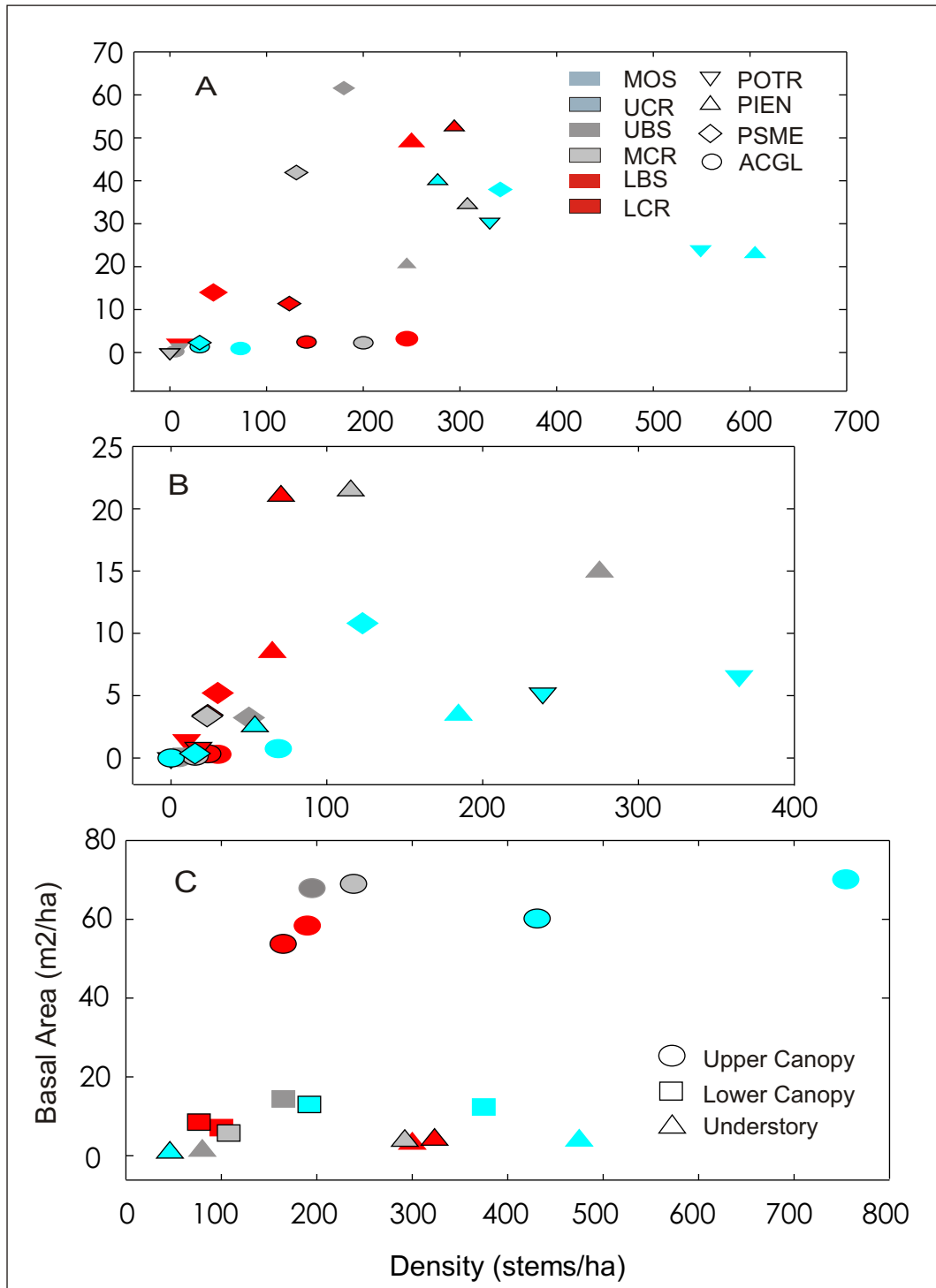
Figure 16. Density and basal area for all six transects. A. Live trees. B. Dead trees. C. Canopy position (live trees). Upper canopy corresponds to "dominant" and "codominant" trees (see Methods for details regarding classification scheme).

Figure 17. Flys Peak (MOS). On this extra-long transect, the estimated pith date of living trees are plotted against their location on the transect. The position of a set of larger-diameter, dead Douglas-fir are also represented. The dbh for each dead tree is shown. No pith estimates were made for these trees but they were assumed to be comparable in age to the group of Douglas-fir in the lower left corner of this graphic. The mean dbh and its coefficient of variation are presented for each group. Also indicated are topographical features that may explain particular age and stand structures.

A Southwestern Mixed-conifer Forests

Severe
FIRE

Mesic   Xeric

POTR   PIPO

Picea/Abies   PSME/ABCO

PSME/ABCO Picea/Abies

B Chiricahua Mixed-conifer forest

Severe
FIRE

Mesic   Xeric

POTR   PIPO   PIST?

Picea/Abies   PSME   PIPO

PSME   Picea/Abies

C Chiricahua Mixed-conifer forest

Severe
FIRE

Short/ long interval
Severe Fire ?

PIEN/PSME   POTR/PIEN/PSME   POTR
                 Eg. UCR & MOS

Mesic   Less Mesic   Mesic   Less Mesic
+Fire?   +Fire   +Fire?   +Fire

PIEN/PSME   PSME/PIEN   PIEN/PSME   PSME/PIEN   PIEN(?)
                          Eg. LBS, LCR   Eg. UBS
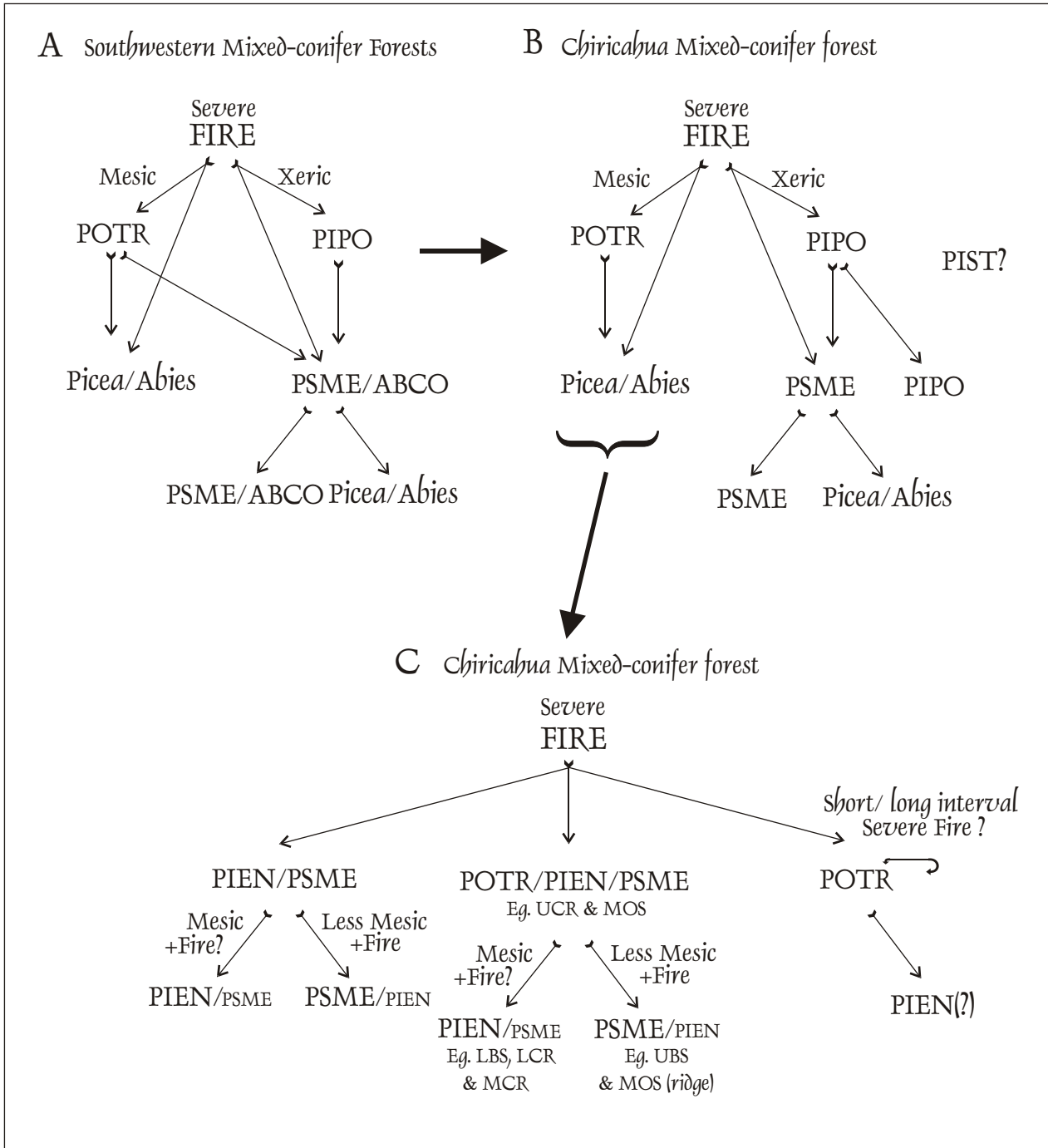   & MCR   & MOS (ridge)

Figure 18. The development of succession models for the high elevation forests in the Chiricahua Mountains. A. Jones (1974). B. Sawyer and Kinraid (1980). C. This study.