



## Environmental Analysis Program

Pomona College  
Biogeochemistry Laboratory

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SOP-F607

# Tree Tagging for Restoration Monitoring

Standard Operating Procedure

|                     |                            |
|---------------------|----------------------------|
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## 1. Purpose

This SOP describes standardized procedures for tagging trees during restoration field work at EA Program field sites. Tree tagging creates a permanent, individual record for each tree so that

management decisions are consistent, repeatable, and transparent across field crews and over time. A future student or technician should be able to revisit a tagged tree and understand exactly why it was flagged and how its condition has changed.

Tree tagging is used to:

- Identify which trees will be retained, removed, or monitored
- Track individual tree condition over time
- Create a permanent record for future groups and project documentation
- Support consistent decision-making across crew members

Recording a consistent set of fields for each individual tree allows data to be combined, compared, and reused across projects and seasons (Handley et al., 2021).

## 2. Scope

- **Applies to:** All EA Program field sites with tree cover, including riparian forest, oak woodland, mixed conifer stands, and planted trees at restoration and campus sites
- **Does not apply to:** Shrubs with DBH below 2.5 cm (use [SOP-F603](#) for shrub cover); diameter, height, and plot-based inventory measurement (use [SOP-F604](#)); timber cruising for commercial harvest; formal urban tree risk assessment, which requires a qualified arborist (International Society of Arboriculture, 2017)
- **Location:** All EA Program terrestrial field sites with woody vegetation

## 3. Definitions

- **DBH (diameter at breast height):** The diameter of a tree trunk measured at 1.37 m (4.5 ft) above ground on the uphill side of the tree. The standard dimension for comparing tree sizes. Measurement procedure is defined in [SOP-F604](#) (Avery & Burkhart, 2002; USDA Forest Service, 2023).
- **Tag:** A numbered aluminum disk fastened to the tree. Each tag number is unique within the project.
- **Flagging:** Colored plastic tape tied loosely around a tree at eye level. Color communicates the management decision for that tree.
- **Condition rating:** A five-level score (Excellent, Good, Fair, Poor, Dead) describing tree health and structure.
- **Crown:** The upper part of a tree, including all branches and foliage.
- **Crown spread:** The average horizontal width of the crown, taken as the mean of the widest spread and a second spread measured at right angles to it (American Forests, 2014).
- **Retain:** Leave the tree in place. Do not remove or damage.
- **Remove:** Tree is scheduled for cutting or restoration thinning.

## 4. Responsibilities

| Role              | Responsibility                                                                                                                                    |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| PI / Field Lead   | Approve flag color codes before the season starts; review completed field forms and photo logs weekly; ensure the project meets restoration goals |
| Trained Personnel | Tag trees per this SOP; complete all fields in the tree assessment record; take required photos; flag trees correctly the first time              |
| New Students      | Complete training before tagging independently                                                                                                    |

Minimum crew size is two persons at all times (safety requirement; see [SOP-F001 Field Safety](#)).

## 5. Safety and Hazards

### Hazards

- **Overhead:** Dead branches and leaning or unstable trees (widow-makers) can fall without warning. Look up before approaching any tree. Do not work under or near hazard trees in high wind.
- **Sharp tools:** Hand saws, loppers, and pruners. Keep blades sheathed while walking, pass tools handle-first, and never carry open blades through brush.
- **Terrain, biota, and weather:** Uneven terrain, poison oak, ticks, snakes, stinging insects, and heat are common at EA field sites and are covered in [SOP-F001 Field Safety](#).

### 5.1. Required PPE

- ☐ Hi-vis vest
- ☐ Closed-toed shoes or field boots
- ☐ Long sleeves and long pants (poison oak protection)
- ☐ Safety glasses or goggles
- ☐ Cut-resistant gloves (when using cutting tools)
- ☐ Hard hat (in areas with overhead hazard trees)
- ☐ Sun protection (hat, sunscreen)

### 5.2. Emergency Procedures

Refer to [SOP-F001 Field Safety](#) for stop-work conditions, biotic and weather hazards, emergency contacts, and incident response. Work in pairs at all times in forested areas.

## 6. Equipment and Materials

| Item                            | Notes                                                    |
|---------------------------------|----------------------------------------------------------|
| Numbered aluminum tags          | Pre-numbered; one per tree                               |
| Aluminum or stainless nails     | For attaching tags; see Section 8.2 on growth allowance  |
| Flagging tape (color set)       | Per the color codes in Section 7                         |
| Diameter (DBH) tape             | Reads diameter directly in cm (pi tape)                  |
| GPS unit or smartphone          | Record coordinates per <a href="#">SOP-F006</a>          |
| Camera or smartphone            | Minimum three photos per tree                            |
| Field data sheets               | Printed from Appendix A                                  |
| Clipboard and pencils           | Pencils work better than pens in wet conditions          |
| Long measuring tape             | For crown spread                                         |
| Clinometer or laser rangefinder | For tree height (optional); see <a href="#">SOP-F604</a> |
| Lumber crayon or paint marker   | For marking the DBH measurement point                    |
| Hand saw or loppers (optional)  | For small branch clearance to access the trunk           |

## 7. Flagging Color Codes

### ! Important

Confirm color codes with the crew and PI before working. Project-specific changes must be documented in the field log.

| Flag Color | Designation                                                     |
|------------|-----------------------------------------------------------------|
| ORANGE     | Confirmed removal: invasive species (primary target)            |
| YELLOW     | Confirmed removal: dead, dying, or hazard tree                  |
| PINK       | Confirmed removal: restoration thinning                         |
| GREEN      | Retain: do not remove                                           |
| WHITE      | Under review: secondary evaluation required (do not remove yet) |
| RED        | Monitoring tree: reassess next cycle                            |
| BLUE       | Approved native for transplant or seed collection               |

**Rule:** Tie flagging loosely at eye level. Do not wrap tightly; flagging can girdle the tree over time.

## 8. Procedure

### 8.1. Before Entering the Field (Daily Pre-Work)

Complete this checklist before leaving the vehicles each day:

- ☐ All PPE inspected and worn
- ☐ GPS units charged; project boundaries pre-loaded
- ☐ Tag number range assigned to each crew member (no duplicates)

- ☐ Communication check complete; phones functional
- ☐ Weather reviewed against the stop-work conditions in [SOP-F001](#)
- ☐ Crew briefed: target species, flag color codes, today's objectives
- ☐ Cutting tools sharpened, sheathed, and inspected

## 8.2. Tree Tagging Step-by-Step

| Step                     | Action                                                                                                                                                                                                   | Why it matters                                                                                                                                                              |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Approach and evaluate | Assess tree form, lean, root zone, crown condition, and nearby hazards from more than one side before tagging                                                                                            | A tree that looks sound from one side may have rot, lean, or deadwood visible from another angle (International Society of Arboriculture, 2017)                             |
| 2. Identify species      | Confirm common and scientific name; cross-check against the project Invasive Priority List and Retain Species List. Use <a href="#">SOP-F602</a> <a href="#">iNaturalist</a> for ID support where needed | Tagging the wrong species leads to the wrong management decision                                                                                                            |
| 3. Measure DBH           | Measure at 1.37 m on the uphill side per <a href="#">SOP-F604</a>                                                                                                                                        | DBH drives removal priority, allometric calculations, and monitoring frequency                                                                                              |
| 4. Assign flag color     | Select the color per Section 7 and tie loosely at eye level                                                                                                                                              | Color communicates the decision to every future crew member                                                                                                                 |
| 5. Install tag           | Fasten the numbered tag on the uphill side at DBH height with a single aluminum or stainless nail. Leave the nail head protruding about 2 to 3 cm so the tree can grow without engulfing the tag         | A consistent, accessible tag is easy to relocate and read in later seasons; leaving the nail proud accommodates radial growth and bark ingrowth (USDA Forest Service, 2023) |
| 6. Photograph            | Take at least three photos: (a) full tree form, (b) tag number close-up, (c) notable defects or hazards                                                                                                  | Photos resolve disputes and provide evidence if a tag is lost                                                                                                               |
| 7. Record data           | Complete all fields in the tree assessment record (Appendix A) before moving to the next tree                                                                                                            | If it is not written down, it did not happen                                                                                                                                |

### **i** Crown spread (optional field)

If crown spread is recorded, measure the widest spread across the crown, then measure a second spread at right angles to the first, and average the two:  $(A + B) / 2$  (American Forests, 2014). Tree height, if recorded, is measured with a clinometer or laser rangefinder per SOP-F604.

## 8.3. Tree Condition Ratings

Use a consistent five-level scale. Note structural defects (lean, cracks, cavities, deadwood, included bark) that influence the rating and any hazard flag (International Society of Arboriculture, 2017).

| Condition | Field indicators                                            |
|-----------|-------------------------------------------------------------|
| EXCELLENT | No significant defects; vigorous, full crown; normal growth |
| GOOD      | Minor defects; healthy overall; normal growth               |
| FAIR      | Moderate defects; reduced vigor; some dieback               |
| POOR      | Major defects; significant dieback; structural risk         |
| DEAD      | No live tissue; standing snag or fallen log                 |

## 9. Quality Control

Perform these checks every tagging day:

1. **Tag uniqueness:** Confirm no tag number was used twice. Reconcile the day's tags against the assigned number ranges.
2. **Species cross-check:** Verify each species identification against the Invasive Priority and Retain Species lists. Flag uncertain IDs for review rather than guessing.
3. **Data completeness:** Confirm every tagged tree has a fully completed assessment record (Appendix A) with no blank required fields.
4. **Photo completeness (end of day):** Before leaving the site, scroll through the day's photos and confirm that every tag number has the three required photos (full form, tag close-up, defects). Re-photograph any tree that is missing photos before leaving.
5. **Second-observer check:** On a subset of trees (for example, 10%), have a second crew member independently confirm species, condition rating, and flag color. Resolve any disagreements with the field lead.

## 10. References

- American Forests. (2014). *Measuring guidelines handbook*. American Forests. <https://www.americanforests.org/>
- Avery, T. E., & Burkhardt, H. E. (2002). *Forest measurements* (5th ed.). McGraw-Hill.
- Handley, P., Walker, H., Ansine, J., Baden, R., Craig, I., Dewhurst-Richman, N., Doick, K. J., Fay, L., Mackie, E., Parratt, M., Perez-Sierra, A., Sparrow, K., & Wheeler, P. (2021). *Individual tree data standard*. Forest Research.

International Society of Arboriculture. (2017). *Basic tree risk assessment form*. International Society of Arboriculture. <https://www.isa-arbor.com/>

USDA Forest Service. (2023). *Forest inventory and analysis national core field guide, volume i: Field data collection procedures for phase 2 plots*. USDA Forest Service. <https://www.fia.fs.usda.gov/library/field-guides-methods-proc/>

## 11. Related SOPs

| SOP                  | Title                         | Relationship                                           |
|----------------------|-------------------------------|--------------------------------------------------------|
| <a href="#">F001</a> | Field Safety                  | Required prerequisite; hazards, stop-work, emergencies |
| <a href="#">F006</a> | GPS and Site Navigation       | Recording tree coordinates                             |
| <a href="#">F602</a> | iNaturalist                   | Species identification support                         |
| <a href="#">F603</a> | Vegetation Transects          | Understory and shrub cover                             |
| <a href="#">F604</a> | Tree DBH and Forest Inventory | DBH, height, and crown measurement                     |
| <a href="#">F606</a> | Canopy Cover                  | Stand structure companion                              |

## 12. Training Record

Before tagging trees independently, each student or new technician must:

1. Read this SOP in full
2. Read [SOP-F001 Field Safety](#) and pass a field safety check (PPE, stop-work conditions, emergency contacts)
3. Know the correct flag color codes
4. Demonstrate correct DBH measurement technique (per [SOP-F604](#))
5. Correctly tag and flag three practice trees with the crew lead observing
6. Complete a tree assessment record without errors
7. Take an acceptable three-photo set (full tree, tag close-up, defects)
8. Be signed off by the PI or field lead

| Trainee | Date read SOP | Date practice trees | Signed off by | Date |
|---------|---------------|---------------------|---------------|------|
|         |               |                     |               |      |

## 13. Appendix A: Individual Tree Assessment Record

Print one copy per tree (or one per plot) before going to the field. Circle the appropriate option where choices are given.

Tag number: \_\_\_\_\_ GPS coordinates: \_\_\_\_\_

Species (common): \_\_\_\_\_

**Species (scientific):** \_\_\_\_\_

**DBH:** \_\_\_\_\_ (circle: in / cm) **Est. height (ft):** \_\_\_\_\_ (clinometer or rangefinder; see SOP-F604)

**Crown spread (ft):** \_\_\_\_\_ (average of two perpendicular axes:  $(A + B) / 2$ )

**Condition rating:** EXCELLENT / GOOD / FAIR / POOR / DEAD (circle one)

**Flag color:** ORANGE / YELLOW / PINK / GREEN / WHITE / RED / BLUE (circle one)

**Proximity hazards** (e.g., lean toward trail, overhanging deadwood, near utility): \_\_\_\_\_

**Adjacent utilities?** YES / NO (if yes, note type and distance): \_\_\_\_\_

**Removal rationale** (e.g., invasive species, hazard, restoration thinning, dead): \_\_\_\_\_

**Photo file references** (e.g., TAG042\_full, TAG042\_tag, TAG042\_defect): \_\_\_\_\_

**Assessor initials:** \_\_\_\_\_ **Date and time:** \_\_\_\_\_

**Additional notes / sketch** (trunk abnormalities, lean direction, nearby landmarks):

\_\_\_\_\_  
\_\_\_\_\_

## 14. Appendix B: Daily Photo Log

Minimum three photos per tree. Store photos with the tag number in the filename (for example, TAG042\_full\_form.jpg).

| Photo # | Tag # | Subject             | Direction facing | Notes |
|---------|-------|---------------------|------------------|-------|
| 1       |       | Full tree form      |                  |       |
| 2       |       | Tag number close-up |                  |       |
| 3       |       | Defects / hazards   |                  |       |
| 4       |       |                     |                  |       |
| 5       |       |                     |                  |       |

## 15. Appendix C: Field Note

This SOP is a field guide. It does not replace project permits or crew lead direction. Review this SOP with your crew lead at the start of each project season.