# Northeast and Southeast Streamflow Duration Assessment Methods: Shade
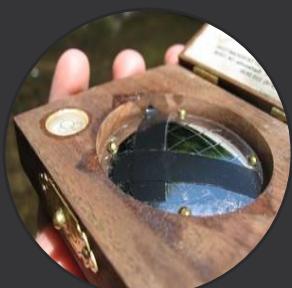
*Video Training*

*2025*
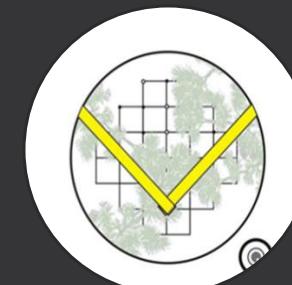
# The SDAMs are based on 12 indicators:

Nine (9) indicators are measured in the **field,** three (3) are **desktop-based**

Five (5) are shared by both SDAMs, plus:
- Two only used in NE SDAM
- Five only used in SE SDAM

*In recommended order of data collection\**

1. Bankfull channel width
2. Entrenchment ratio (NE only)
3. <u>Aquatic macroinvertebrate indicators</u>
   - Benthic Macroinvertebrate Index (BMI) score
   - Total aquatic macroinvertebrate abundance (SE only)
5. Slope (NE only)
6. <u>Shading</u>
7. Prevalence of rooted upland plants in the streambed (SE only)
8. Particle size of stream substrate (SE only)
9. Prevalence of fibrous roots in the streambed (SE only)
10. Drainage area
11. Elevation
12. Average precipitation (May-July) (SE only)

\*Note: there is no #4 (1, 2, 3, 5) to account for the two different aquatic macroinvertebrate indicators.

# Shading

Shade is a **response** to streamflow duration.

- Longer streamflow duration leads to more lush riparian growth, which can provide shade.

It may also be a **control**

- Shade cools temperature and reduces evapotranspiration.

Used in both NE and SE SDAMs.
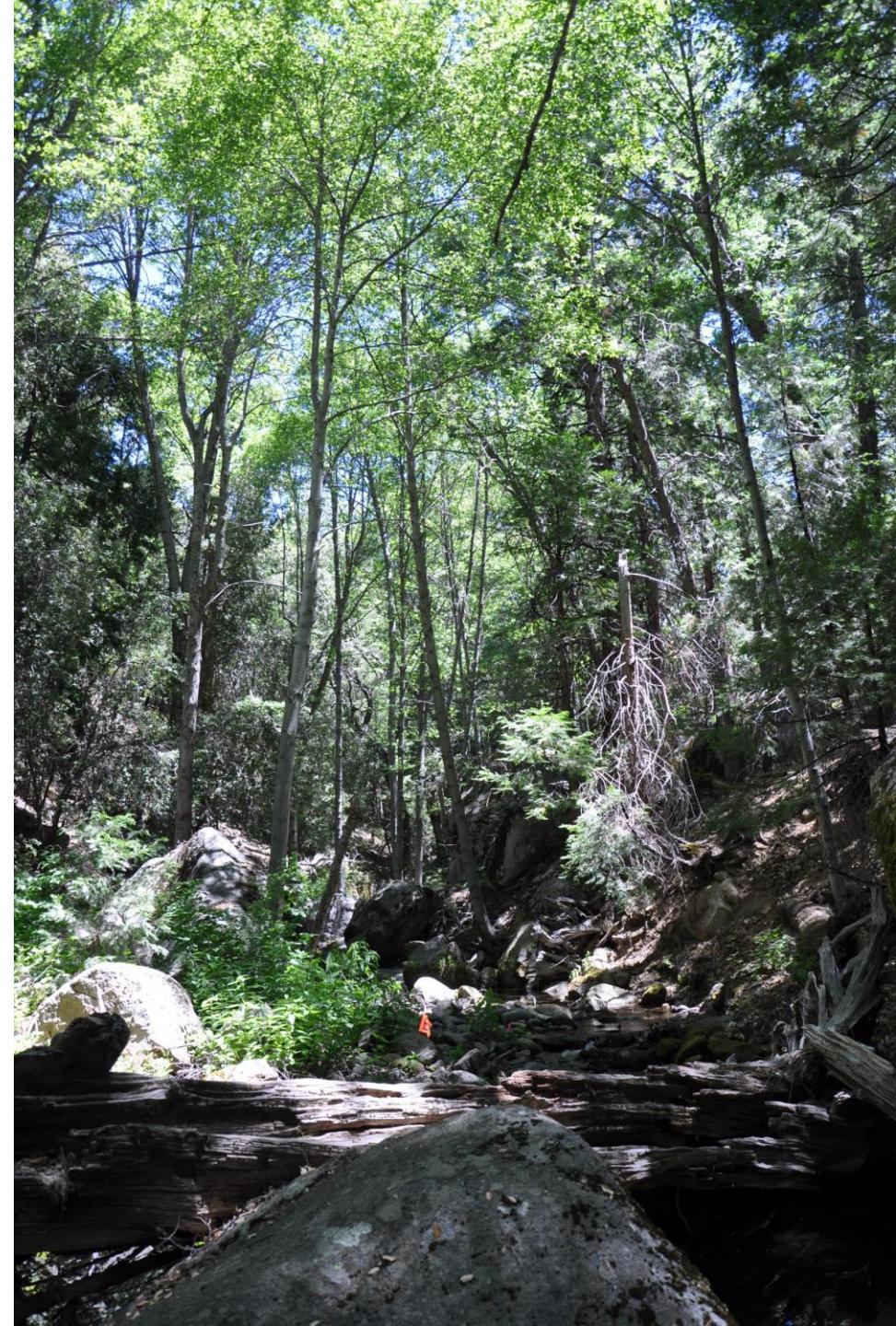
# Shading

- Uses a modified convex spherical densiometer to estimate stream shading (see right).

- Extent of shading represented by number of line intersections (**between 0 and 17**)  in the 'v' obscured by objects that block sunlight from the stream (e.g., vegetation, buildings).

- Take 4 readings in the center of each of the 3 transects (upstream, middle and downstream), for a total of 12 readings.
  - ➢ Facing upstream
  - ➢ Facing downstream
  - ➢ Facing right bank
  - ➢ Facing left bank

# How to read the densiometer

- Readings should be taken 0.3 m (~ 1 ft.) above the water surface or dry streambed with 'v' oriented towards observer. The densiometer should be turned in place, while moving one's body around it to take the four readings. <u>Densiometer must be level</u>!

- In example to right:

  ➢ (a) Shows how to modify densiometer; also notice that bubble is not level, making any reading incorrect.

  ➢ (b) 9 out of 17 intersections are obscured.

- If expression of deciduous woody vegetation is only partial or absent, count all grid intersections that lie within the branches, or the vegetation's 'zone of influence'.
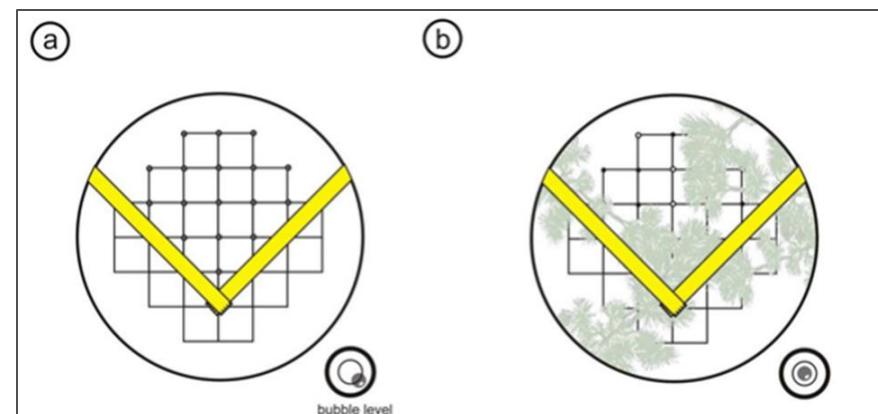
# Record on the field form

Record number of **covered** points at each intersection (up to 17).

- 17 points * 4 measures per transect * 3 transects = 204 maximum possible points

Calculate the percent shaded: 100 * # covered points / 204

### 6. Shading (NE and SE)

At the center of three transects, use a modified convex spherical densiometer (see section 3.8.5 of the NE and SE SDAM) to record the number of points covered by trees, canyon walls, buildings, or other structures that provide shade (up to 17 points per location). Calculate percent shading as the percentage of points covered by such structures (total points covered divided by 204).

Percent shading: _____

|  | Downstream transect | Middle transect | Upstream transect |  |
|---|---|---|---|---|
| Facing upstream | /17 | /17 | /17 |  |
| Facing right bank | /17 | /17 | /17 | Total number of points covered: |
| Facing downstream | /17 | /17 | /17 | _____ / 204 * 100% |
| Facing left bank | /17 | /17 | /17 |  |

Notes on shading:

Video available showing how to use the denisometer in the field on the SDAM supporting materials website

# Knowledge check!

What kind of densiometer do I need to measure shade for the Northeast and Southeast SDAMs?


Convex Densiometer


Concave Densiometer


GRS Densitometer

A convex spherical densiometer

# For more information about SDAMs:

https://www.epa.gov/streamflow-duration-assessment