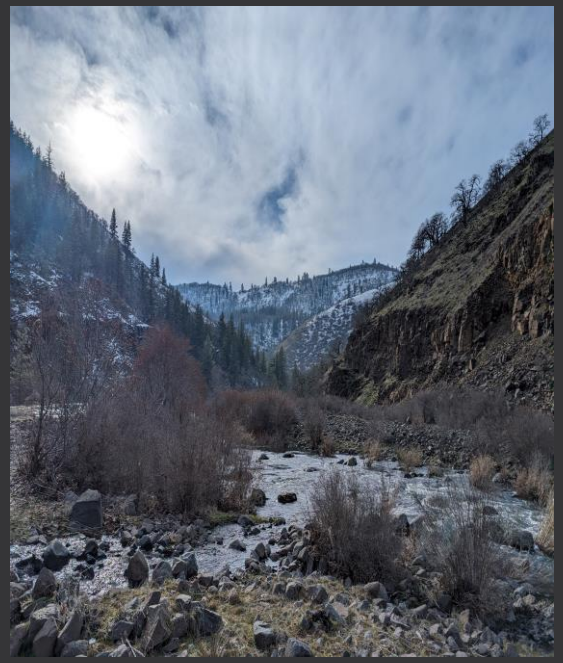
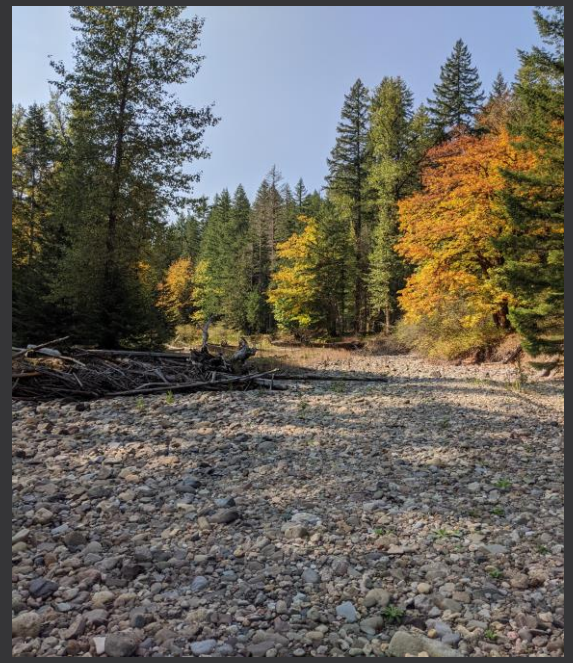
EPA United States Environmental Protection Agency

US Army Corps of Engineers

Pacific Northwest Streamflow Duration Assessment Method: Wetland plant species in or near the streambed and Slope





Virtual Training

2024

The SDAM PNW is based on 5 indicators:

All indicators are measured in the **field**

In recommended order of data collection

1. Presence of aquatic macroinvertebrates
2. Presence of 6 or more Ephemeroptera (mayflies)
3. Presence of perennial indicator taxa
4. Wetland plants in or near streambed
5. Slope

Aquatic macroinvertebrate indicators

And 2 "single indicators":

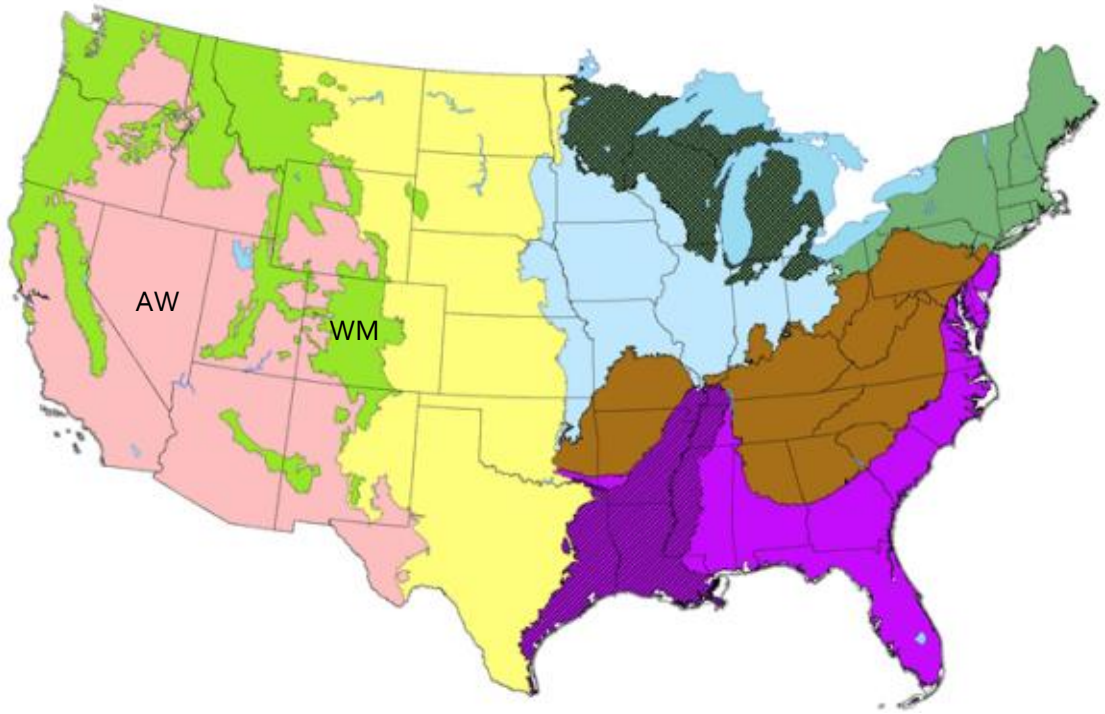
Can conduct concurrently with macroinvertebrate search

1. Presence of one or more fish
2. Presence of one or more aquatic life stages of certain herpetofauna

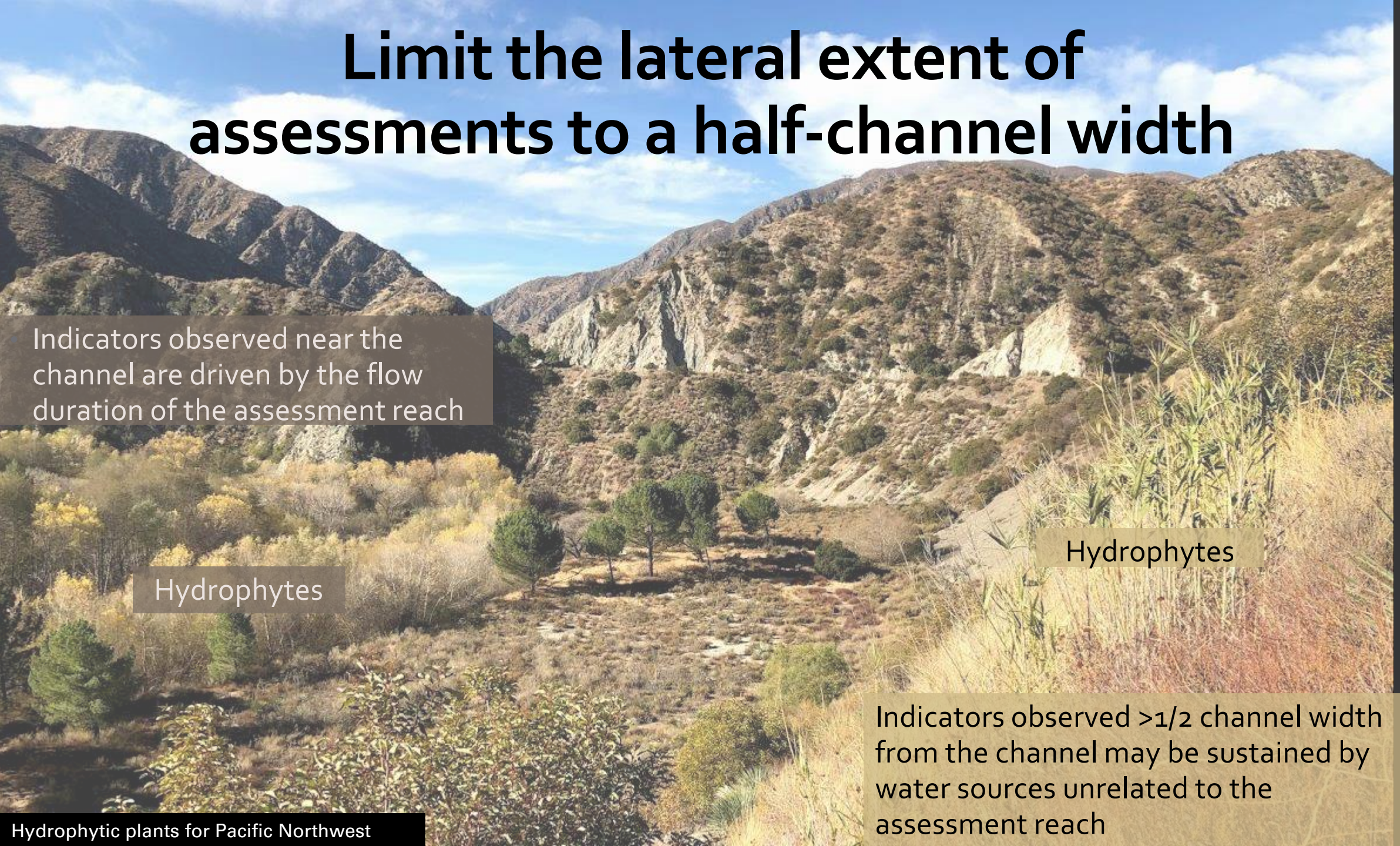
Hydrophytic plant species

- Document the MOST hydrophytic plant species found in the channel or within one half-channel width on either side of the assessed reach.

- Hydrophyte = FACW or OBL (includes SAV) species from most up-to-date applicable version of National Wetland Plant List (NWPL; figure to the right)
  - Western Mountains, Valleys, and Coast (WM) and Arid West (AW) regions have corresponding plant lists
  - Does NOT include FAC species, which may be treated as 'hydrophytes' in other applications



Limit the lateral extent of assessments to a half-channel width



- Indicators observed near the channel are driven by the flow duration of the assessment reach

Hydrophytes

Hydrophytes

Indicators observed >1/2 channel width from the channel may be sustained by water sources unrelated to the assessment reach

Hydrophytic plants for Pacific Northwest

Hydrophytic plant species

Status may change from region to region!

Boxelder
Acer negundo
AW: FACW
WM: FAC

Mugwort
Artemesia douglasiana
AW: FAC
WM: FACW

Do these count as hydrophytes?

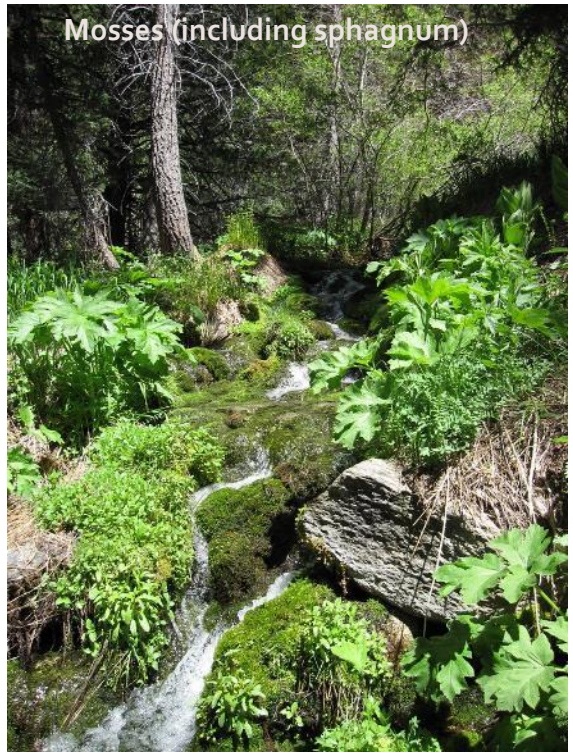
Yes!

NWPL includes all sorts of vascular plants (not just flowering plants).

Do these count as hydrophytes?

No!

NWPL only includes vascular plants

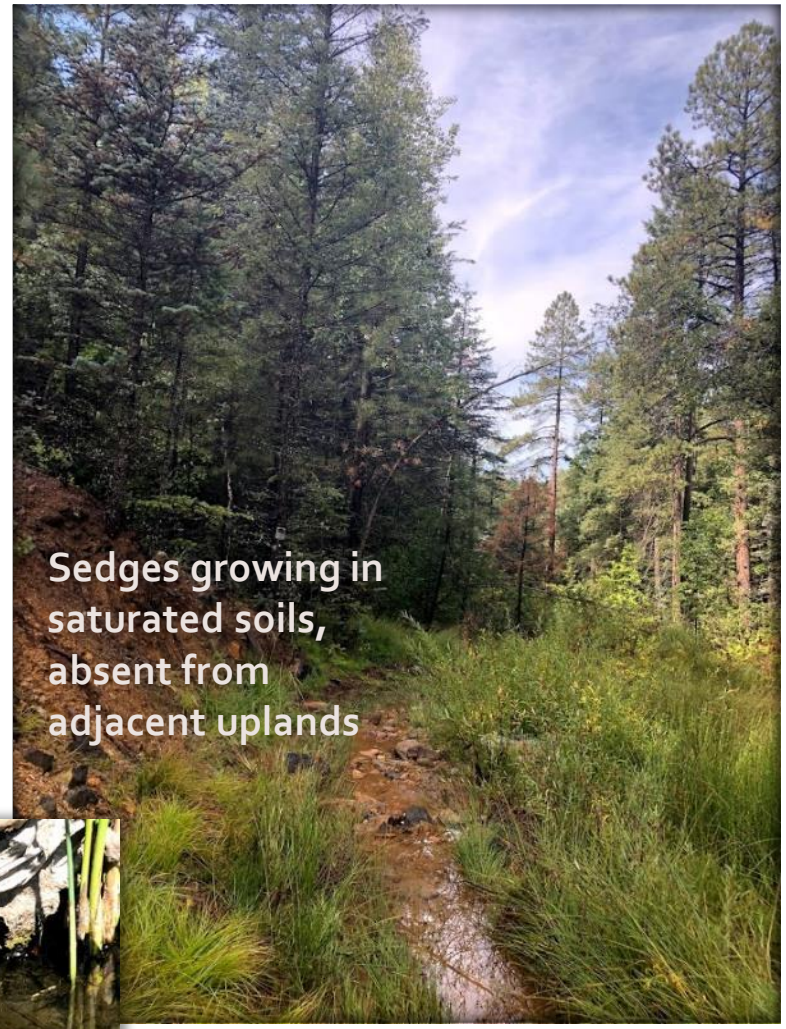


Facultative (FAC) doesn't count!

- Many FAC species are important components of riparian communities in the western ecoregions.
- They do not count as hydrophytes in the Pacific Northwest SDAM.

What if you don't know every plant species?

- Focus where you are most confident with identifications
- Focus on most dominant in the assessment area
- Learn to recognize common species
- Look for likely hydrophytes:
  - Use context!
  - Abundant in riparian zone, but absent from surrounding uplands
  - Grows in saturated soils or in water
- **Photo documentation is essential** if you can't identify in the field. Apps like Seek or iNaturalist can also be helpful for ID.



Take *helpful* photos of plants in the field

More is better!

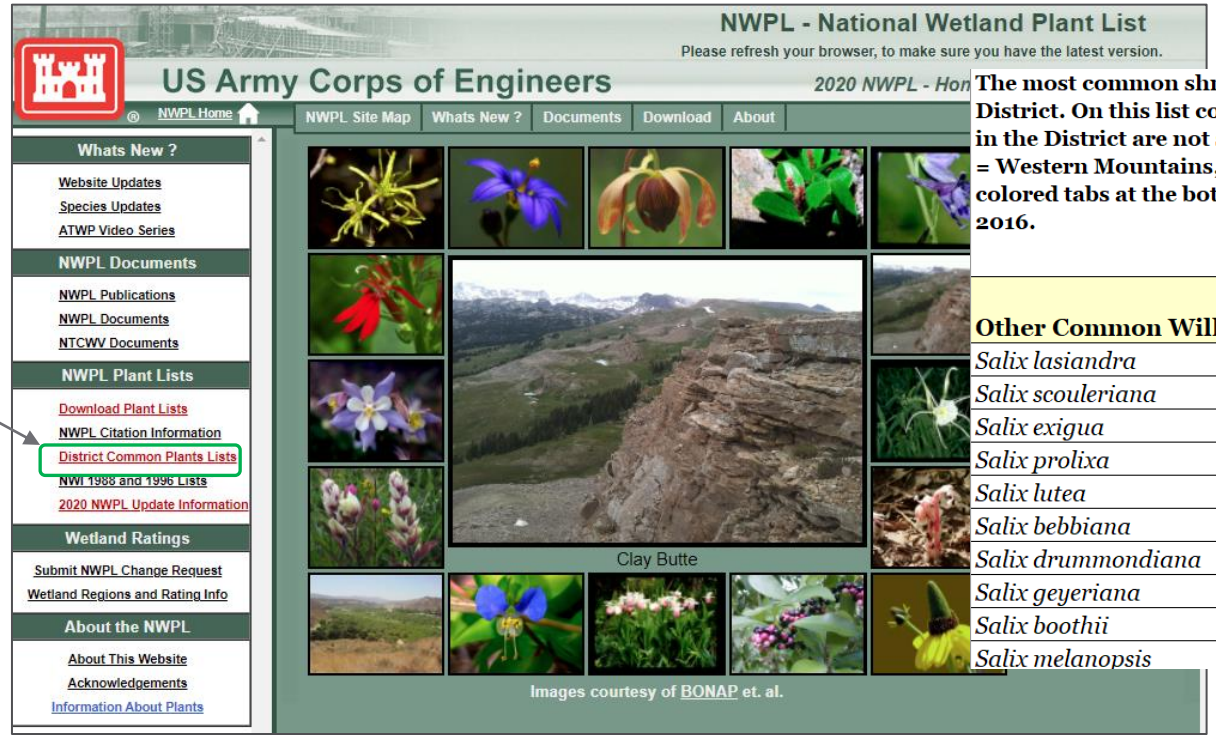
- At least one photo should show context
  - 5-10 feet away is often a good distance
- At least one photo should highlight diagnostic characters
- These characters vary among different groups of plants, but often include:
  - Leaf size, shape, color/texture (both sides!), and arrangement on stem
  - Flowers, if present
  - Seed pods/fruits/berries, if present
  - Bark
  - Branching patterns
  - Basal arrangement of leaves/stems
- Include your hand, penny, key, etc., to provide a size reference.

Context photo of an alder

Closeup of diagnostic characters (i.e., leaf shape, arrangement)

Find regional flora lists to know what species to expect

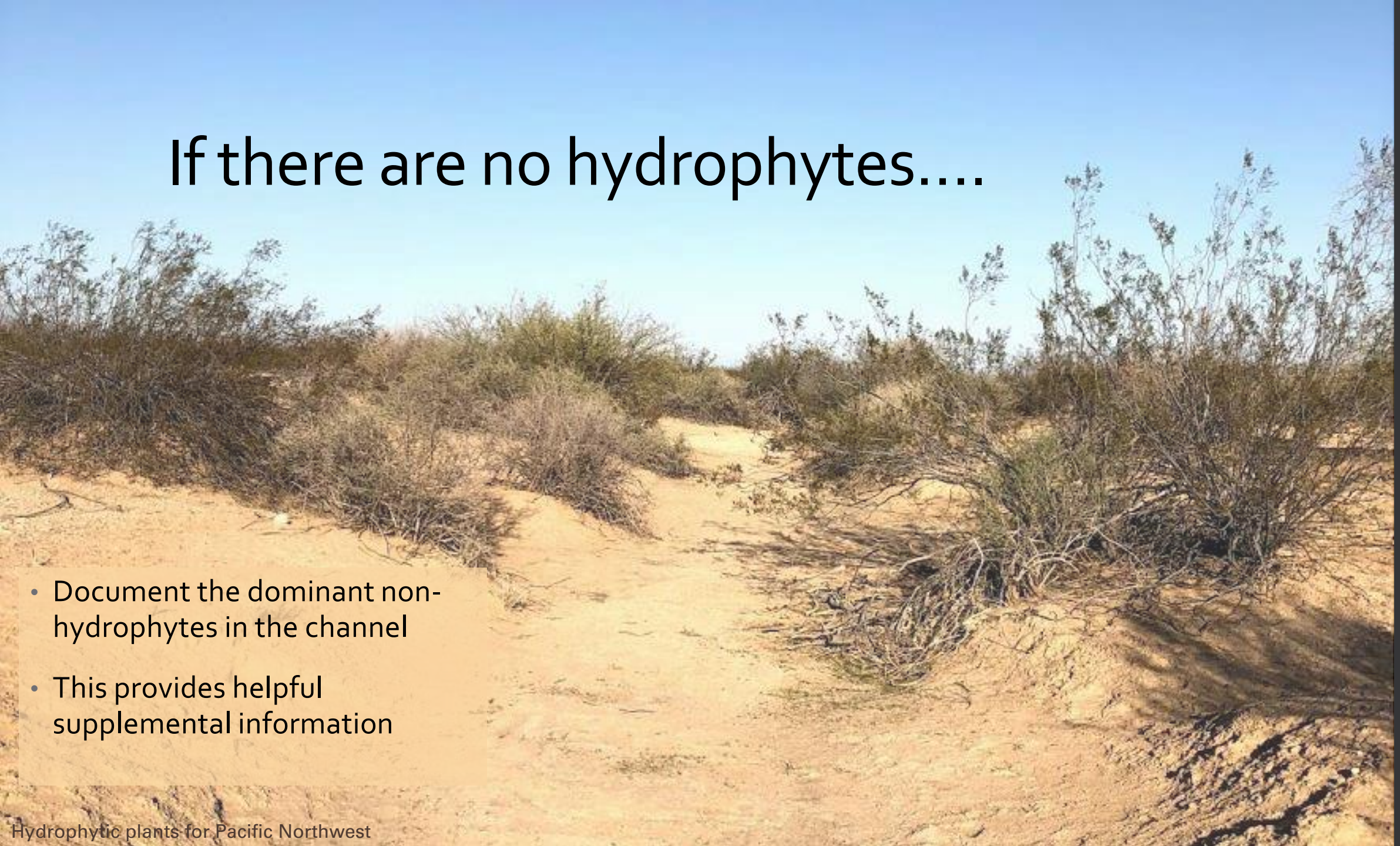
- The NWPL website has links to 'most common species' lists for each USACE District, many of which are hydrophytic.
- Plant lists have likely also been developed for nearby public lands (e.g., national forests, national grasslands) and state native plant societies may have other useful resources.



The most common shrubs on the National Wetland Plant List 2016 (Lichvar et al. 2016), in the Walla Walla District. On this list commonness decreases from top to bottom. Species that occur in less than half the counties in the District are not shown. The Corps wetland regions are abbreviated as follows: AW = Arid West and WMVC = Western Mountains, Valleys and Coast. To view lists of common plants in other families or groups, click on the colored tabs at the bottom of the sheet. Ratings and nomenclature are from the National Wetland Plant List 2016.

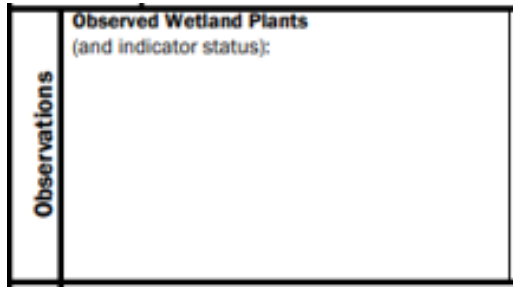
Other Common Willows	Synonym	NWPL 2016 Rating AW	WMVC	Common Name
Salix lasiandra	*Salix lucida*	FACW	FACW	Pacific Willow
Salix scouleriana		FAC	FAC	Scouler's Willow
Salix exigua		FACW	FACW	Narrow-Leaf Willow
Salix prolixa		OBL	OBL	Mackenzie's Willow
Salix lutea		OBL	OBL	Yellow Willow
Salix bebbiana		FACW	FACW	Gray Willow
Salix drummondiana		FACW	FACW	Drummond's Willow
Salix geyeriana		OBL	FACW	Geyer's Willow
Salix boothii		FACW	FACW	Booth's Willow
Salix melanopsis		OBL	OBL	Dusky Willow

If there are no hydrophytes….



- Document the dominant non-hydrophytes in the channel
- This provides helpful supplemental information

Record on the field form



Observations	Observed Wetland Plants (and indicator status):

- Species name
- General notes about distribution
- If no hydrophytes, note dominant non-hydrophyte
- Photo IDs

4. Within the assessment channel, and within one-half channel width of the stream on either bank, are there plants with a wetland indicator status of FACW or OBL, or is there submerged aquatic vegetation present? If so, the answer is "yes."

Indicators			
	1. Are aquatic macroinvertebrates present?	☐ Yes	☐ No
	2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☐ No
	3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☐ No
	4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☐ No
	5. What is the slope? (In percent, measured for the valley, not the stream)	_____ %	

Knowledge check!

True or false: The status of a plant species may change from region to region. For example, a FACW plant in the Arid West may be FAC in the Western Mountains.

A. True

B. False

Plant species may have different wetland indicator status in different regions.

Knowledge check!

Which of these may be considered hydrophytic plant species for the SDAM PNW? Select all that apply.

A. Ferns

B. Sphagnum moss

C. Woody trees and shrubs

D. Filamentous algae

E. Grasses, sedges, and rushes

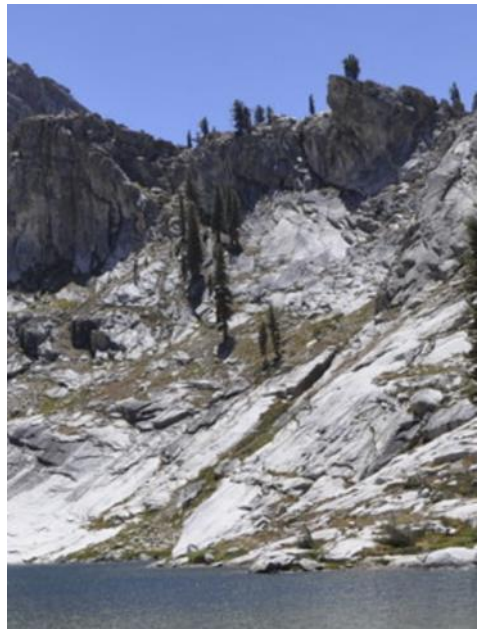
F. Horsetails

G. Liverworts

The National Wetland Plant List includes only vascular plants. Mosses, algae, and liverworts aren't included in the NWPL, although they may be used as wetland indicators in other applications.

Slope

- Slope is neither a **response** to nor a **control** of streamflow duration.
- Generally, steeper slopes are associated with shorter streamflow duration
  - Ephemeral headwaters
  - Perennial mainstems
- This pattern can sometimes be reversed, especially in arid regions
  - Perennial springfed headwaters
  - Ephemeral washes



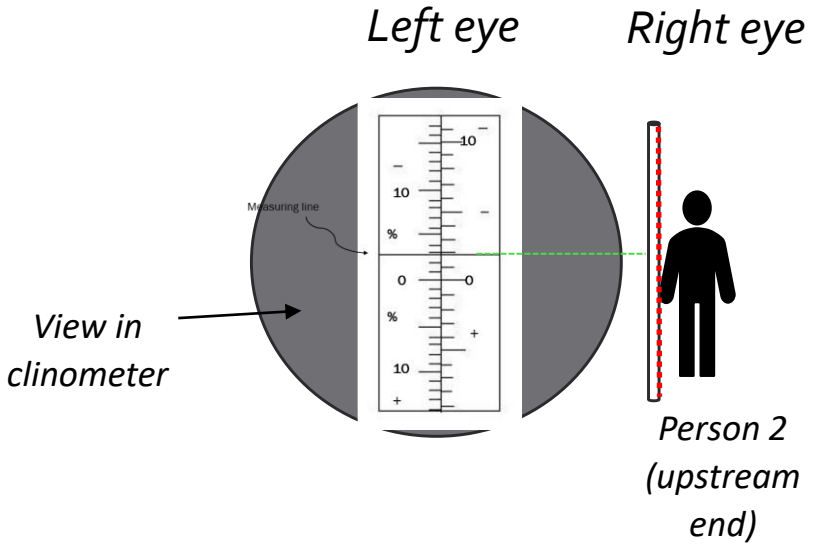
Slope

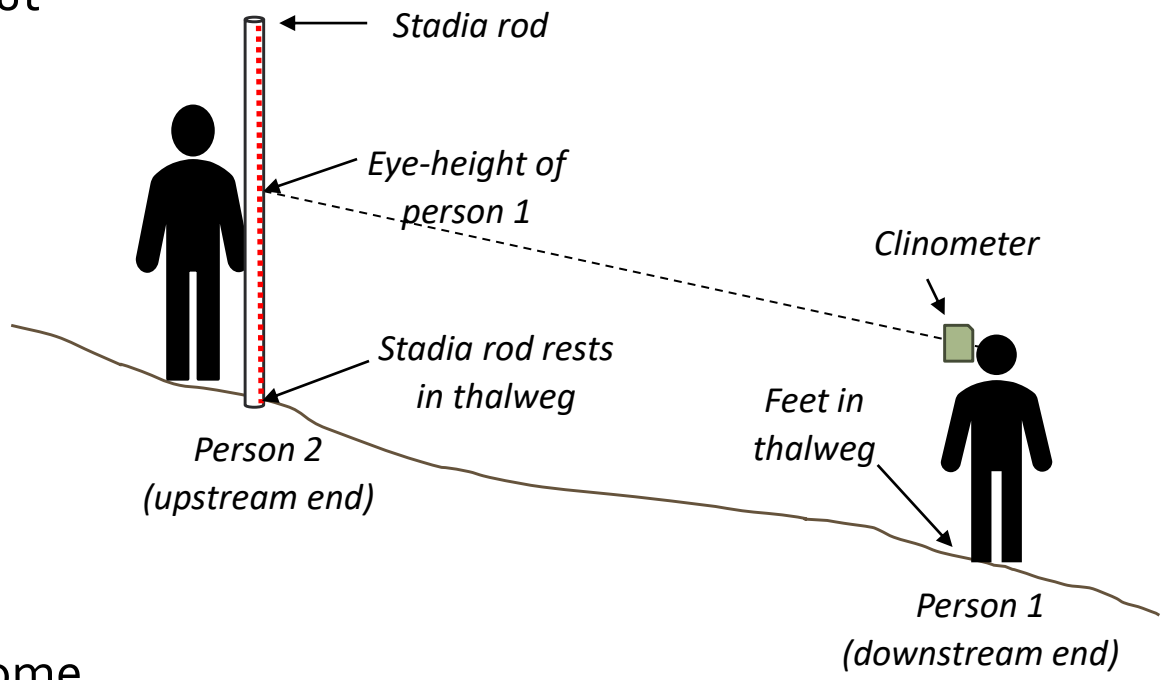
May be measured using a clinometer or an autolevel

- Generally requires two people
- Measurements are always positive (looking upstream from a downstream location), but may be very close to zero

When using a clinometer:

- Keep both eyes open!
- One eye looks through the clinometer
  - Take reading at the horizontal line
  - Make sure you are recording slope in **percent** not **degrees**
- The other eye looks for your eye-height some distance away





View in clinometer modified from "Field technique tips for measuring % slope" in *Forest Measurement* by Joan DeYong, used under CC 4.0. https://openoregon.pressbooks.pub/forestmeasurements

Record on the field form

- Record the slope as a percent, up to the nearest half-percent

5. What is the (percent) slope, as measured with a clinometer, between the lower and upper extent of the assessment reach?

Indicators			
	1. Are aquatic macroinvertebrates present?	☐ Yes	☐ No
	2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☐ No
	3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☐ No
	4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☐ No
	5. What is the slope? (In percent, measured for the valley, not the stream)	_____ %	

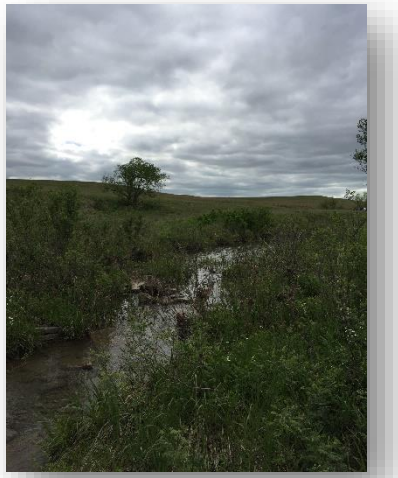
Knowledge check!

True or false: When using a clinometer to measure slope, record degrees and convert to percentage.

A. True

B. False

Record the percent reading directly from the clinometer.


For more information about SDAMs, visit:

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