EPA United States Environmental Protection Agency

US Army Corps of Engineers

ERDC

Arid West and Western Mountains Streamflow Duration Assessment Methods: Number of hydrophytic plant species and Prevalence of rooted upland plants in the streambed

Video Training

2025

The AW and WM SDAMs are based on 11 indicators:

All indicators are measured in the **field**

7 are shared by both SDAMs, plus:

- One only used in AW SDAM
- Three only used in WM SDAM

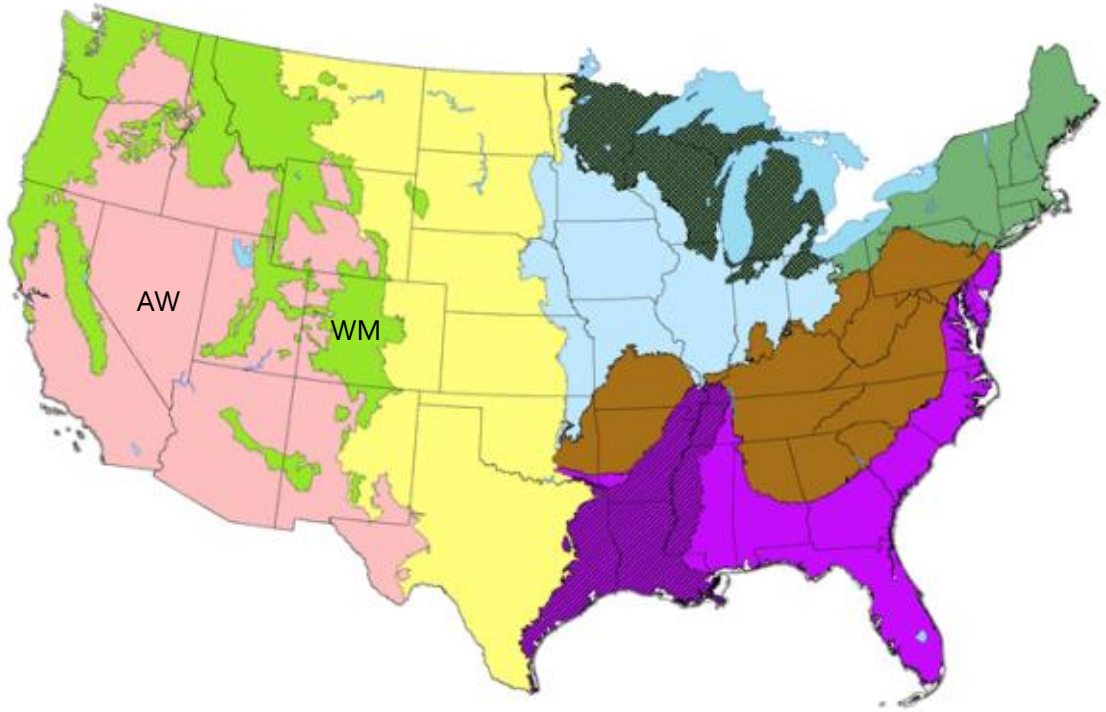
In recommended order of data collection

1. Bankfull channel width
2. Aquatic macroinvertebrate indicators
   - Abundance of perennial indicator taxa
   - Abundance of Ephemeroptera, Plecoptera, and Trichoptera (WM only)
4. Slope
5. Shading (WM only)
6. **Number of hydrophytic plant species**
7. **Prevalence of rooted upland plants in the streambed**
8. Algal cover (AW only)
9. Differences in vegetation
10. Riffle-pool sequence
11. Particle size or stream substrate sorting (WM only)

Number of hydrophytic plant species

- Document how many hydrophytic plant species (up to 6) are found in the channel, or within a half-channel width of the channel.

- Hydrophyte = FACW and OBL species from most up-to-date applicable version of National Wetland Plant list (NWPL; figure to the right)
  - One plant list corresponds to each SDAM Region (AW and WM), note other SDAMs may cover multiple NWPL regions
  - FACW and OBL species are treated the same
  - Does NOT include FAC species, which may be treated as 'hydrophytes' in other applications



- Up to 5 species are needed to score this indicator; documenting 6 or more provides redundancy in case of misidentifications

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

Hydrophytic plant species

Which ones to focus on?

- Where you are the most confident in your identifications
- Most dominant in the assessment area

Salix species are often found as woody dominants

S. exigua (narrowleaf willow)

S. laevigata (red willow)

Cardinal monkeyflower (*Erythranthe cardinalis*, FACW)

- Showy, conspicuous, memorable
- Hard to mistake for anything else!

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?

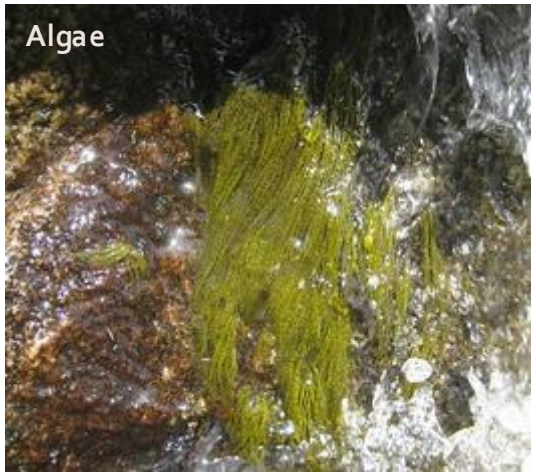
Yes!

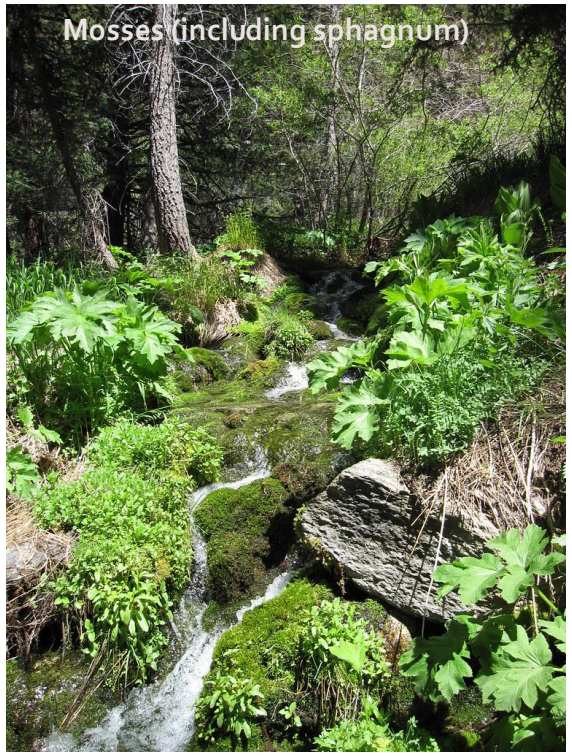
NWPL includes all sorts of vascular plants (not just flowering plants)

Do these count as hydrophytes?

No!

NWPL only includes vascular plants





Facultative (FAC) doesn't count!

- Many FAC trees are conspicuous and cherished components of riparian communities in the Arid West.
  - Cottonwoods (*Populus fremontii*, *P. deltoides*)
  - Some sycamores (*Platanus racemosa*, *P. occidentalis*)
  - Oaks (*Quercus* spp.)
- They do not count as hydrophytes in the SDAMs.
- This does not diminish their conservation value or role in wetland delineation!

Keep an eye out for non-hydrophyte lookalikes!

Many FAC species are common in riparian zones, and certain species resemble common FACW or OBL species

Calif. fan palm
Washingtonia filifera
FAC

Mexican fan palm
W. robusta
FACW

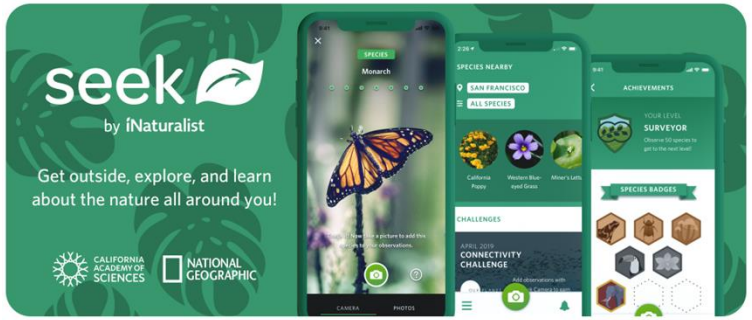
Desert willow
Chilopsis linearis
FAC

Seep willow
Baccharis salicifolia
FAC

Red willow
Salix laevigata
FACW

What if you don't know every plant species?

- You don't need a comprehensive vegetation survey
- Morpho-species are ok
- 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, a penny, a key, etc., to provide a size reference.

Context photo of an alder

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

Learn to recognize common species

Common hydrophytes in Arid West and Western Mountains datasets:

Willows

- *Salix lasiolepis*
- *S. gooddingii*
- *S. laevigata*
- *S. exigua*

Alders

- *Alnus incana*
- *A. rhombifolia*
- *A. rubra*

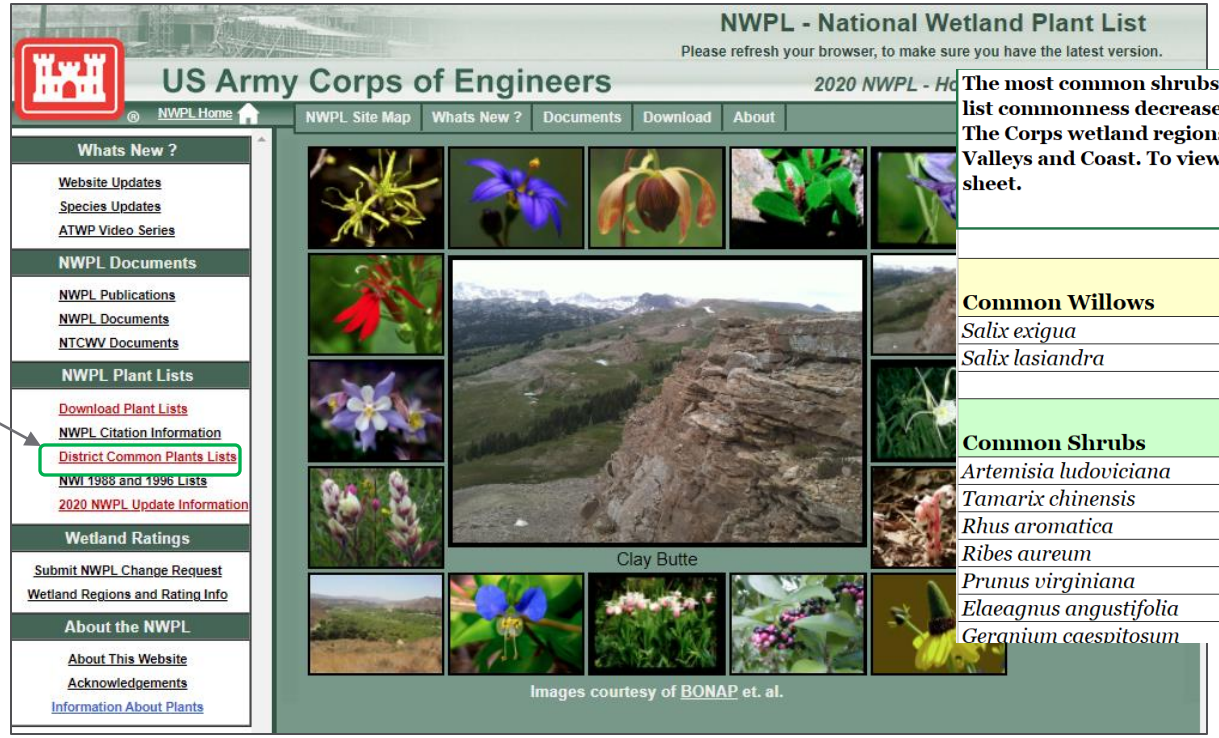
Bulrushes

Arundo

Cattails

Find regional floras 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 parks, national grasslands). State native plant societies may have other useful resources.

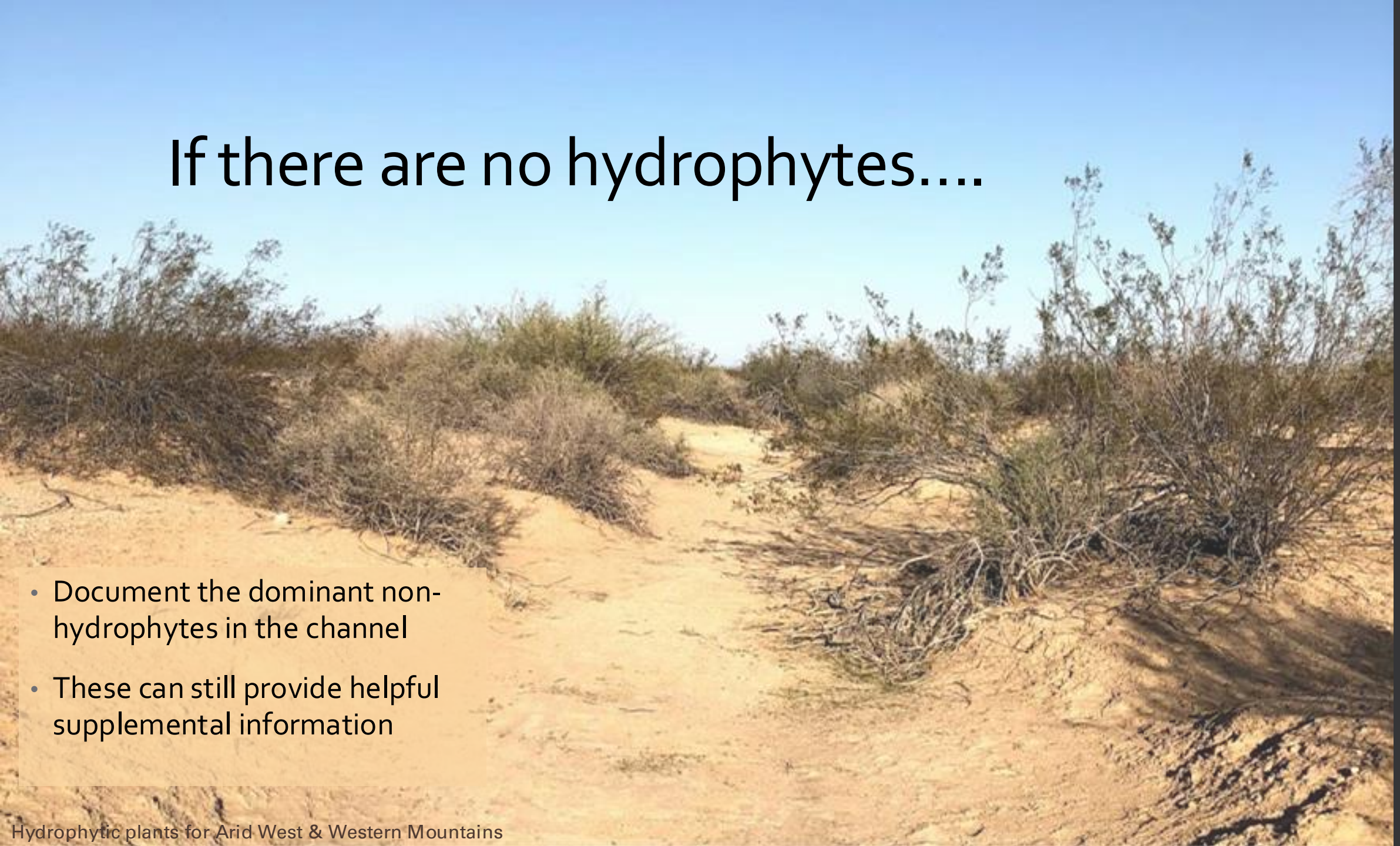


The most common shrubs on the National Wetland Plant List 2016 (Lichvar et al. 2016), in the Albuquerque District. On this list commonness decreases from top to bottom. Species that occur in less than half the counties in the District are not shown. The Corps wetland regions are abbreviated as follows: AW = Arid West, GP = Great Plains, 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.

Common Willows	Synonym	NWPL 2016 Rating AW	GP	WMVC	Common Name
Salix exigua		FACW	FACW	FACW	Narrow-Leaf Willow
Salix lasiandra	*Salix lucida*	FACW	FACW	FACW	Pacific Willow

Common Shrubs	Synonym	NWPL 2016 Rating AW	GP	WMVC	Common Name
Artemisia ludoviciana		FACU	UPL	FACU	White Sagebrush
Tamarix chinensis		FAC	FACW	FAC	Five-Stamen Tamarisk
Rhus aromatica		FACU	UPL	UPL	Fragrant Sumac
Ribes aureum		FAC	FACU	FAC	Golden Currant
Prunus virginiana		FAC	FACU	FACU	Choke Cherry
Elaeagnus angustifolia		FAC	FACU	FAC	Russian-Olive
Geranium caespitosum		FAC	FAC	FAC	Purple Cluster Crane's-Bill

If there are no hydrophytes….



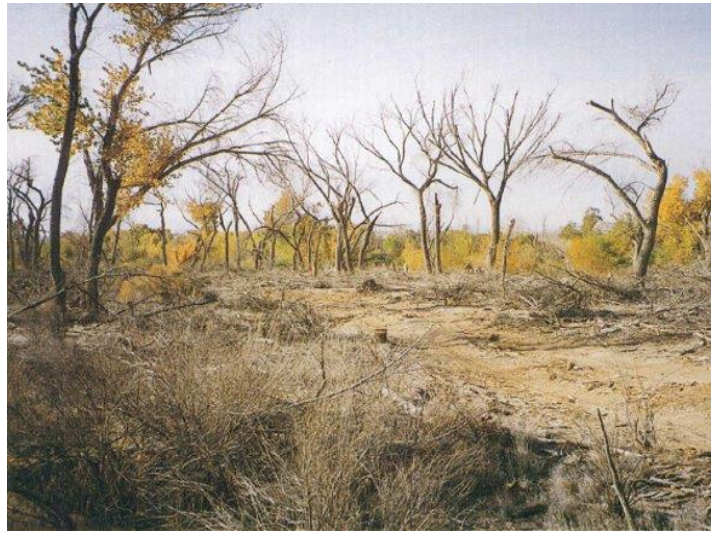
- Document the dominant non-hydrophytes in the channel
- These can still provide helpful supplemental information

You can almost always find something growing

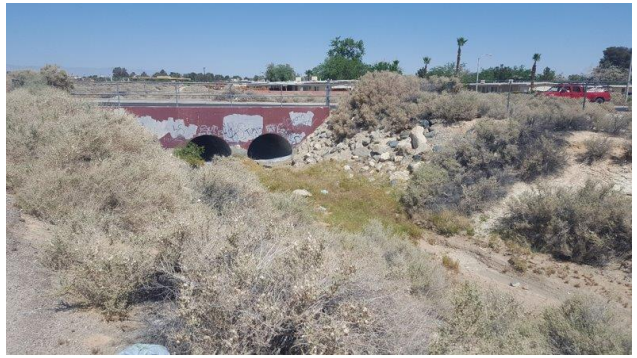
- Even in engineered (non-natural) channels!
- Don’t leave without recording something about what’s growing.
- Exceptions: Recently graded channels, certain concrete channels.

Note unusual distributions or conditions

- Long-lived hydrophytic species appear to be in decline (e.g., mature trees)
  - Suggests a long-term change in water availability
  - Changes may be caused by natural variability (e.g., climatic cycles, earthquakes) or human activities (e.g., diversions)
  - It may take many years (decades) for mature trees to die from lack of water



- Long-lived hydrophytic species only observed as seedlings
  - Suggest relatively recent colonization (after flooding, etc.); normal flow may be insufficient to support these species long-term



- Hydrophytes occur as isolated specimens in one location (not dispersed throughout reach)
  - May suggest that hydrophytes are being sustained by sources of hydrology separate from the reach

Record on the field form

- Species name (or morpho-species description)
- Notes about distribution
- Photo IDs
- Notes about hydrophytes in general

6. Number of hydrophytic plant species (AW and WM)

Record up to 6 hydrophytic plant species (FACW or OBL in the appropriate regional wetland plant list, depending on location) within the assessment area: **within the channel or up to one half-channel width outside the channel**. Explain in notes if species has an odd distribution (e.g., covers less than 2% of assessment area, long-lived species solely represented by seedlings, or long-lived species solely represented by specimens in decline), or if there is uncertainty about the identification. Enter photo ID or check if photos are taken.

_____ Number of hydrophytic plant species identified from the assessment reach without odd distribution. Enter zero if none were found.

Check if applicable: ☐ No vegetation in assessment area

Species	Odd distribution?	Notes	Photo ID

Notes on hydrophytic vegetation:

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!

Are species-level identifications required for hydrophytes?

A. Yes. You cannot be sure of a plant's status as a hydrophyte without species-level identifications.

B. No. Within some regions, some genera exclusively contain hydrophytic plant species (e.g., *Alnus* within the Arid West). A genus-level ID can be sufficient.

Species-level identifications are not always necessary for streamflow duration assessment. Higher levels of identification may be sufficient.

Knowledge check!

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

A. Ferns

B. Sphagnum moss

C. Duckweed

D. Woody trees and shrubs

E. Filamentous algae

F. Grasses, sedges, and rushes

G. Liverworts

H. Horsetails

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

Algae are used in a different indicator in the AW SDAM (but not the WM SDAM).

Knowledge check!

This plant is very common in riparian zones in southwestern deserts. Should it be treated as a hydrophyte?

A. Yes

B. No

This is red willow (*Salix laevigata*). Like most willows in the Arid West and Western Mountains, it has a status of FACW.

Recognizing willows and other common hydrophytes is an essential skill for the SDAMs assessors

Knowledge check!

This plant is very common in riparian zones in southwestern deserts. Should it be treated as a hydrophyte?

A. Yes

B. No

This is desert willow (*Chilopsis linearis*), which is rated FAC.

Recognizing common non-hydrophytes (especially those that resemble hydrophytes) is an essential skill for SDAM practitioners.

Prevalence of rooted upland plants in streambed

- An 'upland plant' is a species with a NWPL indicator of FAC, FACU, or UPL; also includes those with No Indicator (NI).
- Prolonged soil saturation associated with longer flow durations do not promote establishment of these species.
- Must be rooted in the streambed. Plants rooted in the bank or on top of islands do not count, including those that may extend over the channel.

Individuals of *Ambrosia artemisiifolia* (common ragweed; FACU) are present in the streambed.

Prevalence of rooted upland plants in streambed

- Score is based on a visual estimate.
- *Higher* score indicators *lower prevalence!*
- Half-scores are allowed

Score	Evidence of longer flow duration	Guidance
0	Poor	Rooted upland plants are prevalent within the streambed/thalweg
1	Weak	Rooted upland plants are consistently dispersed throughout the streambed/thalweg.
2	Moderate	There are a few rooted upland plants present within the streambed/thalweg.
3	Strong	Rooted upland plants are absent from the streambed/thalweg.

Prevalence of rooted upland plants in streambed

Low score

- Lots of upland vegetation on streambed

High score

- No upland vegetation on streambed

Rooted upland plants in the streambed for Arid West & Western Mountains

Record on the field form

- Half scores are allowed
- Identify the dominant upland species, if any are found
- Notes about species observed and photo IDs

7. Prevalence of upland rooted plants in the streambed (AW and WM)

____(0-3) *Half-scores (0.5, 1.5, and 2.5) are allowed.*	Evaluate the prevalence of upland rooted plants (i.e., plants rated as FAC, FACU, UPL, or not listed in the regionally appropriate National Wetland Plant List) in the streambed. 0 (Poor) Rooted upland plants are *prevalent* within the streambed/thalweg. 1 (Weak) Rooted upland plants are *consistently dispersed* throughout the streambed/thalweg. 2 (Moderate) There are *a few* upland rooted plants present within the streambed/thalweg. 3 (Strong) Rooted upland plants are *absent* from the streambed/thalweg.

Upland Species	Notes	Photo ID

Notes on upland rooted plants:

Rooted upland plants in the streambed for Arid West & Western Mountains

Knowledge check!

True or false: Upland plants must be rooted in stream thalweg to be counted for the Prevalence of Rooted Upland Plants' indicator.

A. True

B. False

Upland plants must be rooted within the **streambed**, but do not need to be confined to the stream **thalweg**.

For more information about SDAMs:

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