EPA United States Environmental Protection Agency

US Army Corps of Engineers

ERDC

Great Plains Streamflow Duration Assessment Method: Number of hydrophytic plant species and Presence/absence of rooted upland plants in the streambed

Video Training

2025

The Great Plains SDAM is based on 8 indicators:

All eight indicators are measured in the **field.**

*Indicators evaluated along the entire length of the assessment reach

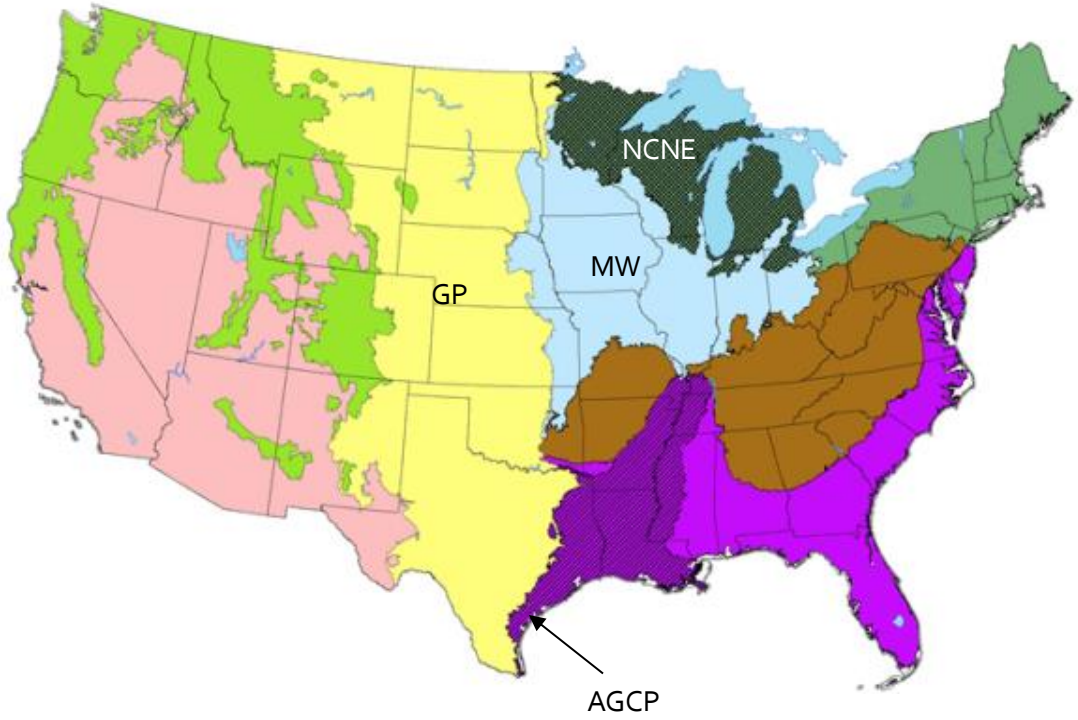
In recommended order of data collection:

- Bankfull channel width
- Total aquatic macroinvertebrate abundance
- **Number of hydrophytic plant species***
- **Presence/absence of rooted upland plants in the streambed***
- Differences in vegetation*
- Riffle-pool sequence*
- Particle size or stream substrate sorting*
- Sediment on plants or debris*

Number of hydrophytic plant species

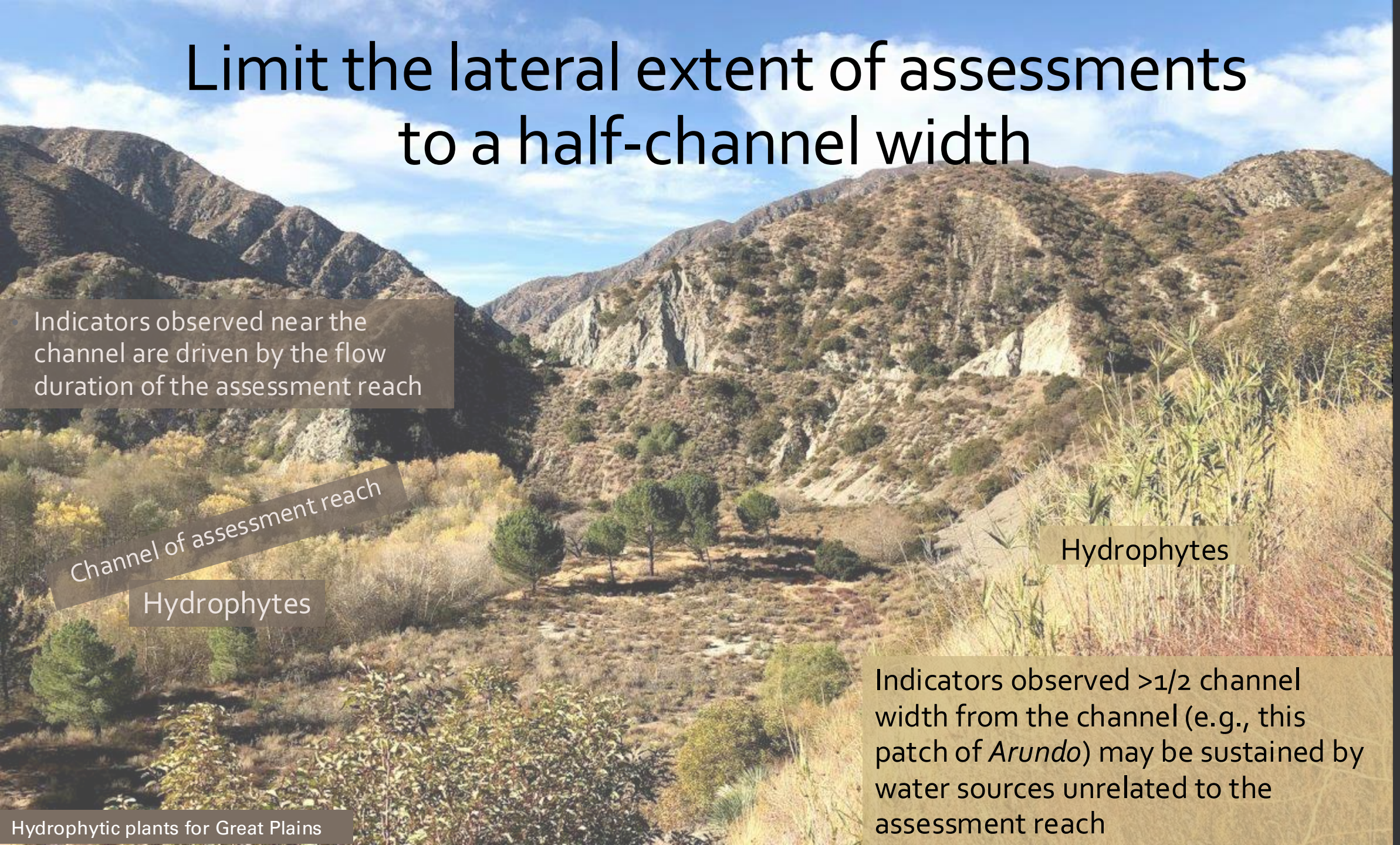
- Document how many hydrophytic plant species are found in the channel, or within a half-channel width of the channel.

- Hydrophyte = FACW and OBL species from most up-to-date applicable version of National Wetland Plant list (NWPL; right)
  - Multiple NWPL regions overlap GP SDAM: Great Plains (GP), Midwest (MW), Northcentral-Northeast (NCNE), and Atlantic Gulf Coastal Plain (AGCP)
  - FACW and OBL species are treated the same
  - Does NOT include FAC species, which may be treated as 'hydrophytes' in some applications



- Up to 2 species are needed to score this indicator; documenting up to 3 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 most confident in your identifications
- Most dominant in the assessment area

Salix species are often found as woody dominants

S. exigua
(narrowleaf willow)

S. amygdaloides
(peachleaf willow)

Swamp milkweed (*Asclepias incarnata*, FACW)

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

FAC doesn't count!

- Many FAC trees are found in riparian corridors of the Great Plains:
  - Cottonwood (*Populus deltoides*)
  - Green ash (*Fraxinus pennsylvanica;* in GP NWPL region only)
  - Boxelder (*Acer negundo*)
  - Hackberry (*Celtis occidentalis;* FAC in MW and NCNE, FACU elsewhere)
- They do not count as hydrophytes in the GP SDAM.
- This does not diminish their conservation value!

P. deltoides (cottonwood)

F. pennsylvanica (green ash)

Do these count as hydrophytes?

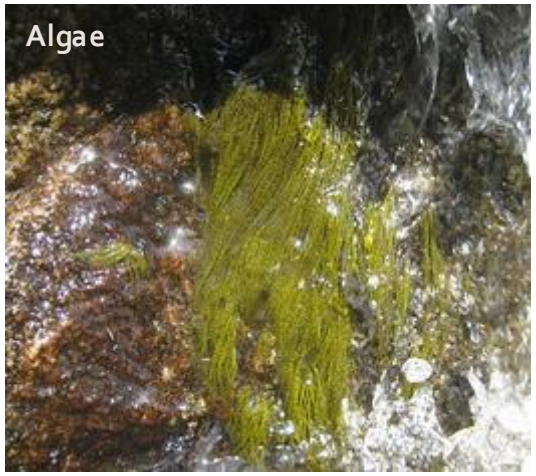
Yes!

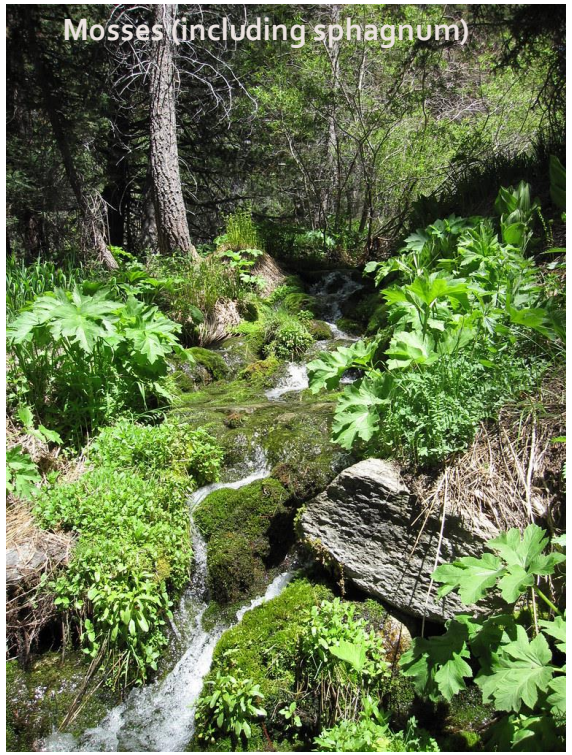
NWPL includes all sorts of vascular plants (not just flowering plants)

Do these count as hydrophytes?

No!

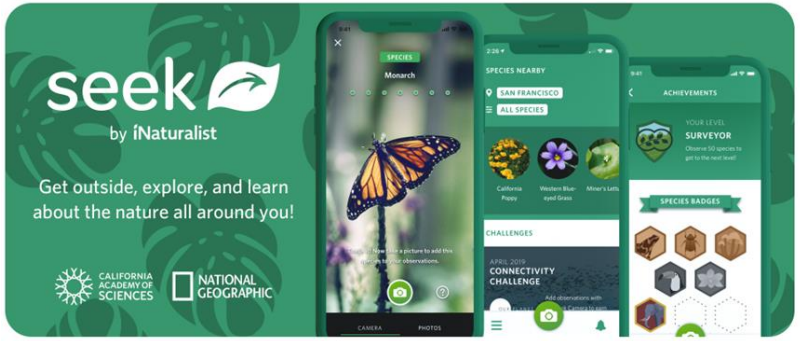
NWPL only includes vascular plants





What if you don’t know every plant species?

- A comprehensive vegetation survey isn't needed
- 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.

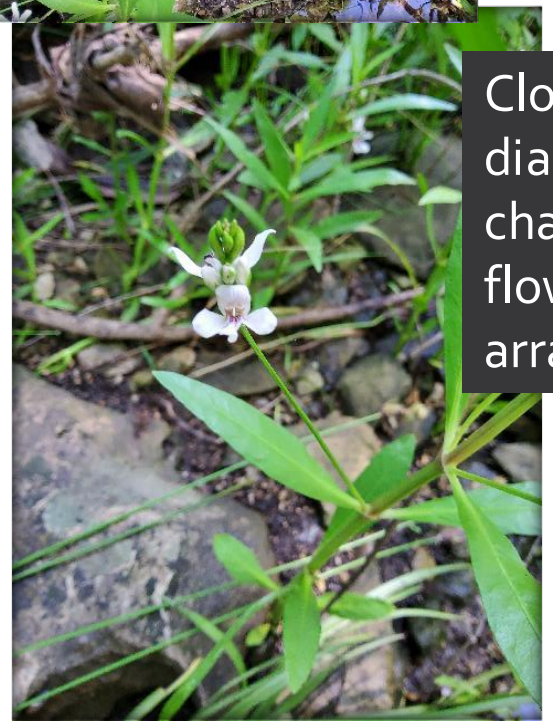


Take *helpful* photos of plants in the field

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!), & arrangement on stem
  - Flowers, if present
  - Seed pods/fruits/berries, if present
  - Bark
  - Branching patterns
  - Basal arrangement of leaves/stems
- Include your hand or a penny, key, etc. to provide a size reference.

Context photo of American water willow (*Justicia americana*)



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

Learn to recognize common genera

Common hydrophyte genera in Great Plains SDAM dataset:

Willows

- *Salix* sp.

Reed canary grass (*Phalaris arundinacea*)

Bulrushes

- *Schoenoplectus* sp.
- *Bolboschoenus* sp.

Sedges

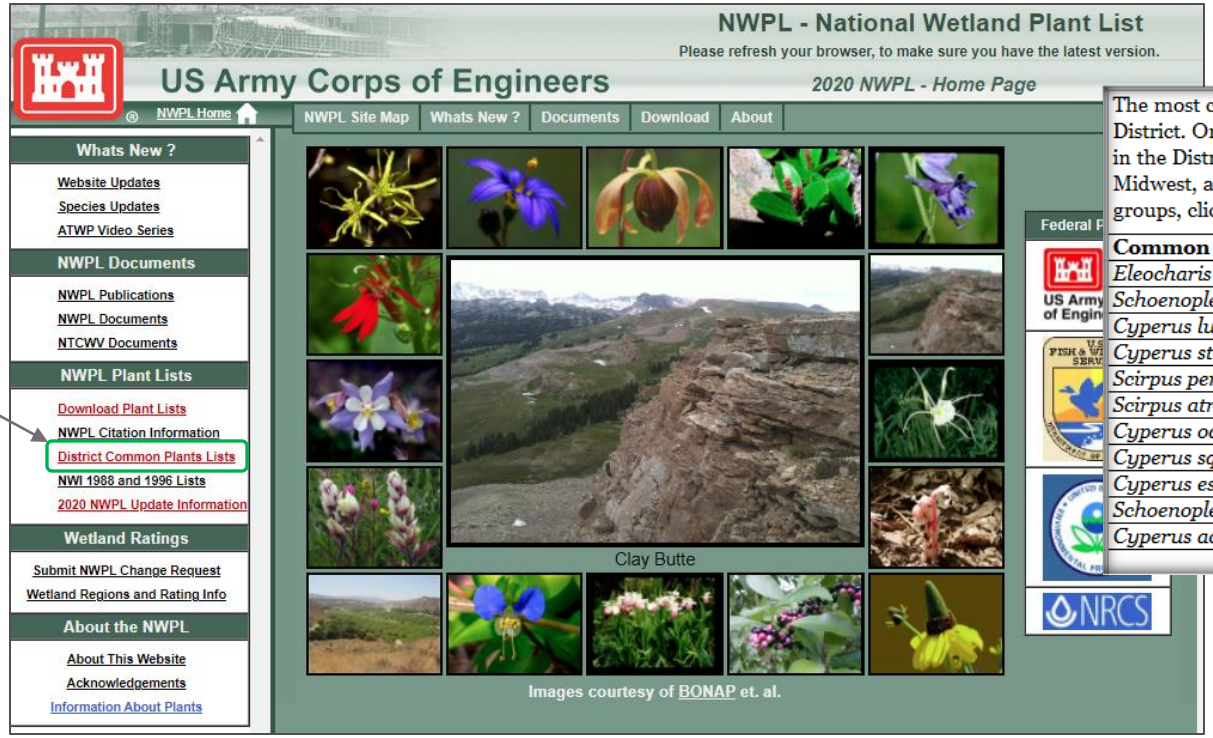
- *Carex* sp.

Cattails

- *Typha latifolia*
- *T. angustifolia*

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) and state native plant societies may have other useful resources.



The most common sedges on the National Wetland Plant List 2016 (Lichvar et al. 2016), in the Kansas City 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: GP = Great Plains, MW = Midwest, and EMP = Eastern Mountains and Piedmont. To view lists of common plants in other families or groups, click on the colored tabs at the bottom of the sheet.

Common Sedges	Synonym	GP	MW	EMP	Common Name
Eleocharis palustris		OBL	OBL	OBL	Common Spike-Rush
Schoenoplectus tabernaemontani		OBL	OBL	OBL	Soft-Stem Club-Rush
Cyperus lupulinus		FACU	FACU	UPL	Great Plains Flat Sedge
Cyperus strigosus		FACW	FACW	FACW	Straw-Color Flat Sedge
Scirpus pendulus		OBL	OBL	OBL	Rufous Bulrush
Scirpus atrovirens		OBL	OBL	OBL	Dark-Green Bulrush
Cyperus odoratus		FACW	FACW	FACW	Rusty Flat Sedge
Cyperus squarrosus		OBL	OBL	FACW	Awned Flat Sedge
Cyperus esculentus		FACW	FACW	FACW	Chufa
Schoenoplectus pungens		OBL	OBL	OBL	Three-Square
Cyperus acuminatus		OBL	OBL	OBL	Taper-Tip Flat Sedge

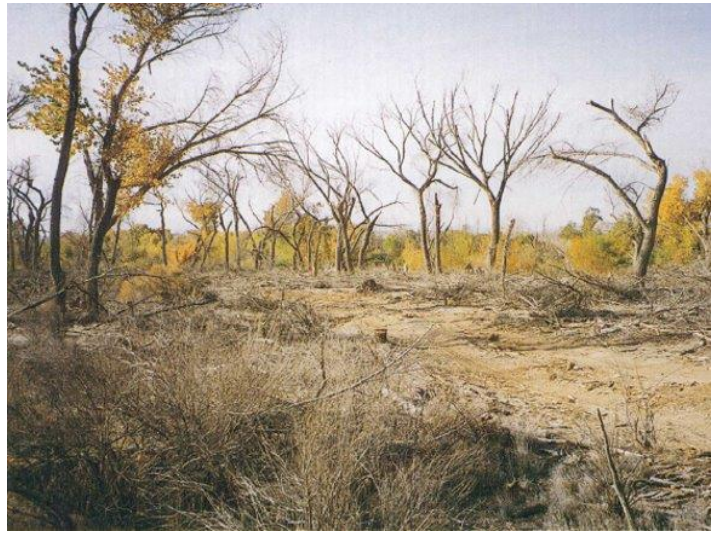
You can almost always find something growing

- Even in engineered (non-natural) channels!
- Don't leave without recording something about what's growing.
  - Document the dominant non-hydrophytes in the channel - these non-hydrophytes can still provide helpful supplemental information
- Exceptions: Recently graded channels, certain concrete channels.

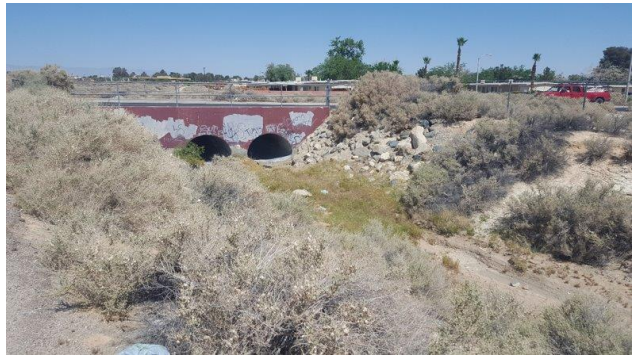
Hydrophytic plants for Great Plains

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

3. Number of Hydrophytic Plant Species

Record up to 4 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 photo is taken.

Check if applicable: ☐ No vegetation in assessment area

Species	Odd distribution?	Notes	Photo ID

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

Notes on Hydrophytic Vegetation:

Knowledge check!

True or false: There is only one National Wetland Plant List applicable to the Great Plains SDAM.

A. True

B. False

There are four NWPL regions that apply to the GP SDAM, depending on where your reach is located. Plant species may have different wetland indicator status in different regions. Stinging nettle (*Urtica dioica*) is FACW or FAC depending on region.

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 the Great Plains, some genera exclusively contain hydrophytic plant species (e.g., *Schoenoplectus*). In these types of situations, a genus-level ID is 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 Great Plains SDAM? 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.

Presence/absence 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 prevents 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.

Presence/absence of rooted upland plants in streambed

Present

Lots of upland vegetation on streambed

Absent

No upland vegetation on streambed

Presence/absence of rooted upland plants in streambed for Great Plains

Record on the field form

4. Presence/absence of rooted upland plants in streambed

Evaluate the reach for upland rooted plants (i.e., plants rated as FAC, FACU, UPL, NI, or not listed in regionally appropriate regional National Wetland Plant List) in the streambed.

Mark the appropriate box for rooted upland plants.

☐ Rooted upland plant individuals are present in the reach.

☐ Rooted upland plant individuals are absent in the reach.

Upland species	Notes	Photo ID

Notes on presence/absence of rooted upland plants in streambed:

Presence/absence of rooted upland plants in streambed for Great Plains

For more information about SDAMs:

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