Introduction to Plant Identification

Module #1 – Nomenclature, Resources, and Types.

The National Association of Wetland Managers welcomes you to this remote training in coordination with the Region 5 Tribal Wetlands Working Group and EPA Region 5.

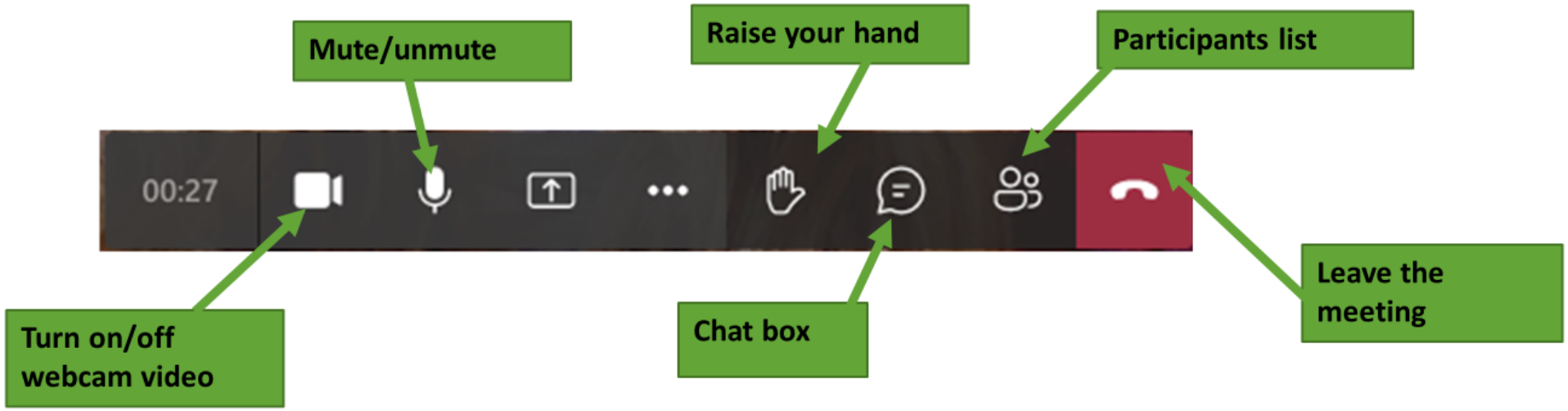
Agenda for Today's Training

- Welcome and Introductions (5 minutes)
- Training Presentation (55 minutes)
- Question & Answer Session (25 minutes)
- Wrap Up and Reminders (5 minutes)

- Note today's session is being recorded and the recording will be shared with all Region 5 TWWG members.

Microsoft Teams Meeting Panel

Participating in a meeting



Audio and Video: You can mute yourself and turn your video off.
Raise your hand: To ask a question.
Chat box: If preferred, you can ask questions via the chat box as well. Everyone in the meeting can see what you type in the chat box and NAWM staff will be monitoring the chat.
Participant list: Allows you to see everyone who is attending the meeting.

Jeff Lapp, Sr. Science Policy Advisor for NAWM will be the presenter for Training Modules 1 and 2.

This training is made possible through a Cooperative Agreement with U.S. EPA Region 5.

Today's training will review:

- Plant nomenclature and naming conventions.
- Various characteristics to aid in identification.
- Plant identification resources.
- Dichotomous Key usage.
- Supporting information.
- Sample collection and field tools.
- Plant types and definitions.

Note: This training is intended as an introduction to plant identification and is geared to the novice botanist or as a refresher for others. Also, specific assessment methods may define specific parameters to be utilized for that method.

Plant Classification System

- Kingdom
- Division
- Class
- Order
- Family
- Genus
- Species

} Focus for describing and identification

Family

- A group of plants with similar characteristics especially flowers, fruits, and seeds, the reproductive structures are used for distinction.
- The size of a family varies from 1 to 100+
  - Ginkgoaceae has one genus *Ginkgo biloba*
  - Rosaceae has 100 genera (Malus, Spiraea, Rosa, etc.)

Genus (plural is Genera)

- a group of plants which is a closely related, definable and exhibit similar characteristics (flowers, fruit, stems, leaves, or roots) and genetic affinity

The genus is usually a noun, capitalized and can be descriptive (such as):

- a plants appearance - *Hemerocallis* (day and beauty)
- purported medicinal qualities - *Pulmonaria* (lungwort)
- resemblance to body parts - *Hepatica* (liver)
- honors a person by using their name – *Kalmia* (Peter Kalm)

Species:

- the basis of the binomial system of nomenclature
- a class of plants whose members have the same main characteristics and are able to breed with each other.

Species can be further divided into more specific descriptions:

- Such as a:
  - Cultivar – Selected desired traits; controlled reproduction.
  - Variety – Recognizable type/difference; alba.
  - Subspecies – Distinct form; usually geographic population.
  - Hybrid – Noted with an x before the species; cross between species; can occur naturally between populations.

Writing plant names:

- Scientific names should always be underlined or in italics
- The genus is capitalized, the specific epithet is not
  - Example: *Sarracenia purpurea*

Integrated Approach to Plant Identification

- Visual inspection of plant characteristics
- Photographic references
- Plant classification keys
- Expert advice
- Web based tools
- Does it make sense? Check range, growing conditions, etc.

Visual observations

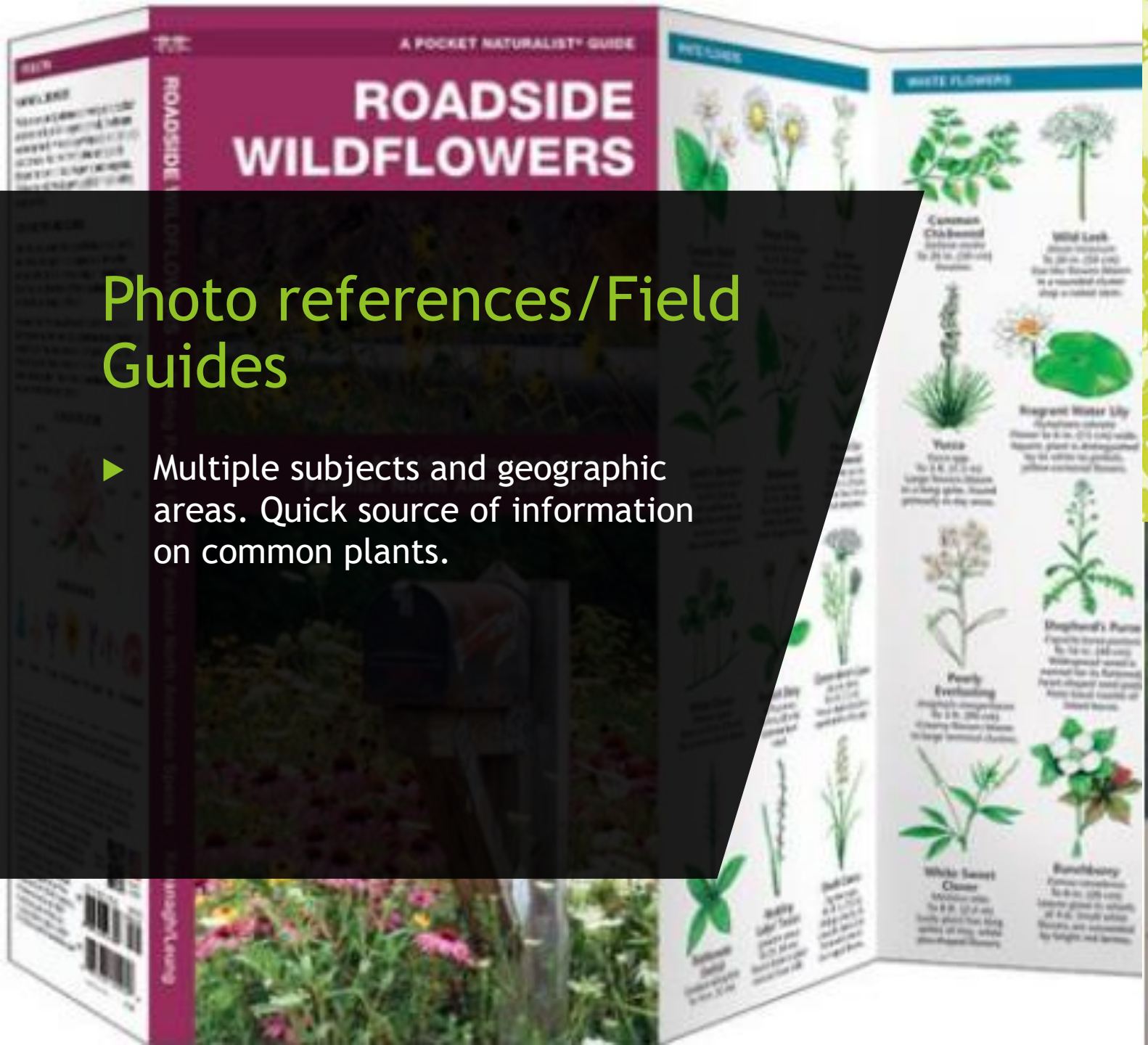
- Is the plant I'm observing:
  - Herbaceous – non-woody; dies back in winter.
  - Woody – persistent stems and trunk.
  - Coniferous – needle shaped leaves; cone bearing; note: some coniferous plants lose their needles.
  - Broadleaved Evergreen
  - Deciduous – loses leaves

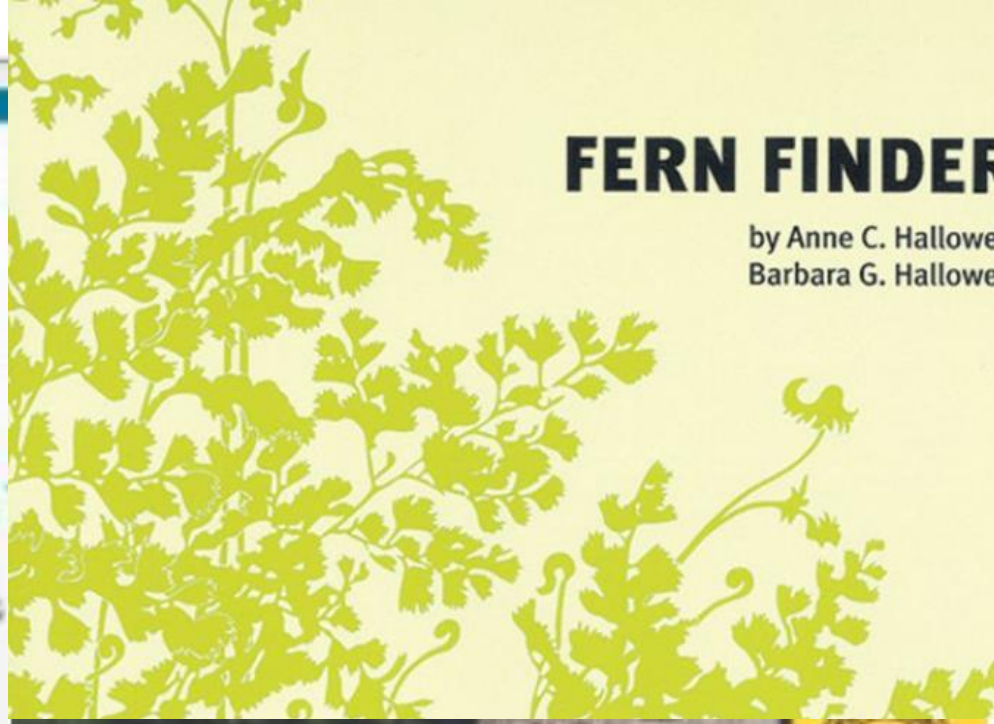
Visual observations (continued)

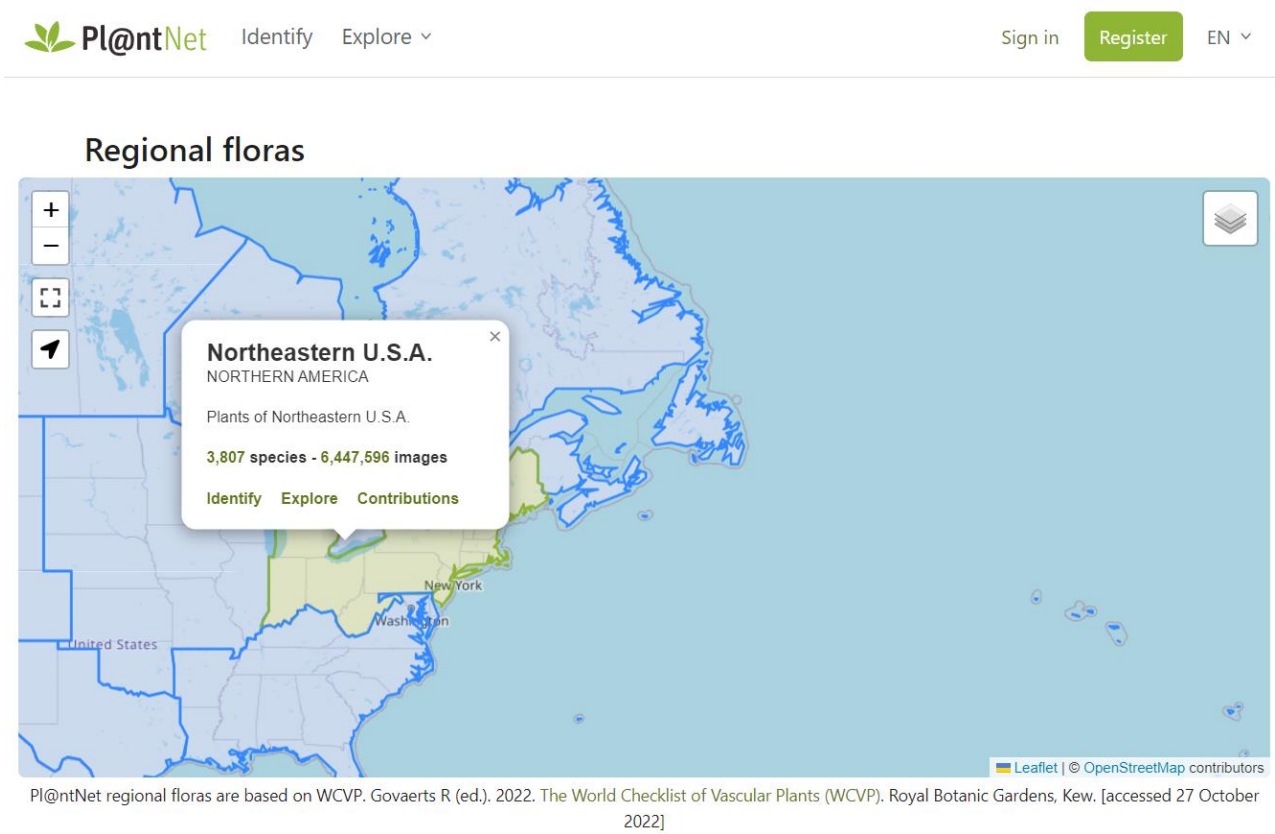
- What is the form of the plant?
  - Tree, shrub, vine?
  - Tall and thin; low and spreading; rounded; vase shaped.
- Special characteristics?
  - Flower type and color.
  - Berries or other fruit, nuts, cones.
  - Bark texture
  - Trunk type – Single or multi-stemmed?

Photo references/Field Guides

- Multiple subjects and geographic areas. Quick source of information on common plants.







Pl@ntNet regional floras are based on WCVP. Govaerts R (ed.). 2022. The World Checklist of Vascular Plants (WCVP). Royal Botanic Gardens, Kew. [accessed 27 October 2022]

Web/App based programs

Dichotomous Plant Keys –

A method for selecting characteristics which help reduce the potential options for species identification.

As selections are made the number of species are reduced until the correct species is identified.

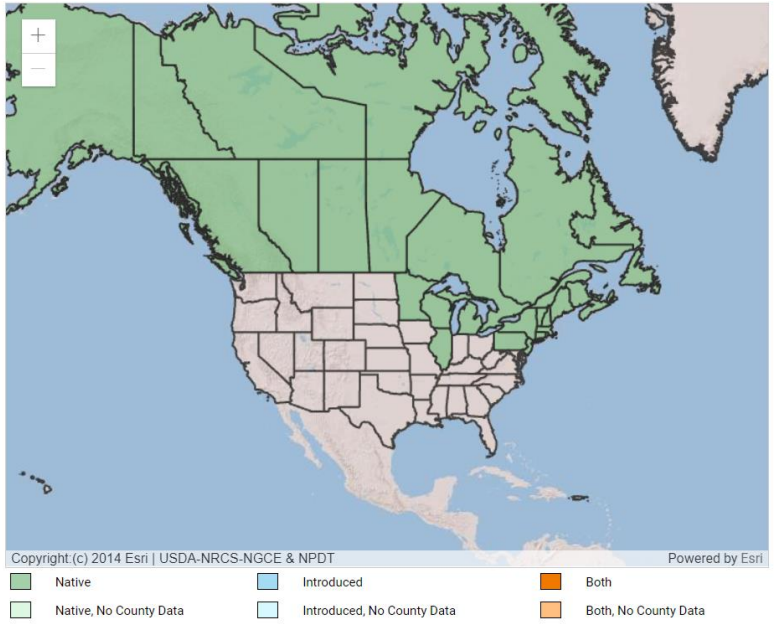
Key - Example

- A. Plant's foliage is not green (go to….)
- A. Plant's foliage is green (go to B.)
  - B. Plant is herbaceous (go to….)
  - B. Plant is woody (go to C.)
    - C. Plant is evergreen (go to…)
    - C. Plant is deciduous (go to D.)
      - D. Plant has fleshy fruit (go to…)
      - D. Plant has nuts (go to…)

A. Leaves needle-like
  B. Needles clustered
    C. 2-5 needles/cluster *Pine*
    CC. >10 needles/cluster
  BB. Needles not clustered
    D. Pegs on twigs
      E. Square, sharp needles *Spruce*
      EE. Round, blunt needles *Hemlock*
    DD. No pegs on twigs
      F. Large pointed buds *Douglas-fir*
      FF. Buds round, clustered *True fir*

AA. Leaves flattened and scale-like
  G. All leaves short and sharp *Giant Sequoia*
  GG. Some leaves not sharp

Example of dichotomous key (cont.)



Check Species Information to Confirm Probability of Occurrence:

Does the Resulting ID make Sense?

Habitat:

Is the location suitable habitat for the identified species (i.e. Aquatic vs Terrestrial).

Other Characteristics:

Flowering Time – Is this when it is blooming ?

The Biota of North America Program
North American Vascular Flora

Amelanchier cusickii

Amelanchier arborea

Expert Advice/Herbarium Analysis

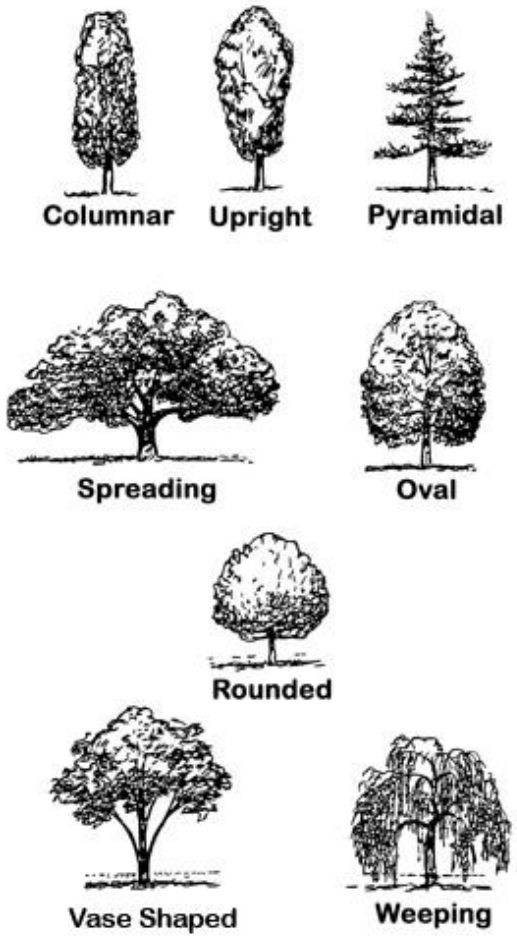
- Talk to Colleagues
- College/University Professors
- Botanic Gardens
- Herbarium Species Review (Smithsonian largest collection)
  - historical records of regional species' distributions,
  - the basis for new species descriptions and other taxonomic studies,
  - teaching aids,
  - reference specimens for applications requiring accurate species identification (e.g., forensics or taxonomic and floristic surveys), and
  - archived voucher specimens to document the species identity of plants used for various other biological investigations.

Remember:

- Sometimes you just can't get to the specific species
- Use your judgment
- You get down to 2 or so species and one is wet the other high altitude.
- Does it matter?
  - Species x is FACW, Species y is FACU.
  - Or is it a dominant plant at the site?
  - Use Genus name and spp. (*Iris spp.)*

Plant Types:

- Tree
- Shrub
- Vine
- Herbaceous (Forb or Phorb)
  - Fern and fern Allies
  - Grass/rush/sedge
  - Oddballs



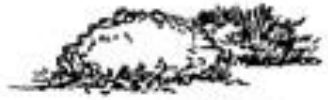
Trees:

- No set definition: Usually they are the tallest form of plants, perennial, have a woody trunk and are branched.
- They may be very long lived.
- Have multiple forms from single to multi-trunked; rounded, vase shaped, oval, etc.
- Deciduous or evergreen, needled or leafed.

Shrubs:

- Usually are a low (small), woody, perennial plant with several woody stems coming up from the ground and have multiple forms.
- They can be varied in height from prostrate to upright, single or multi-stemmed, deciduous or evergreen, needled or leafed.

Oval



Spreading

Upright

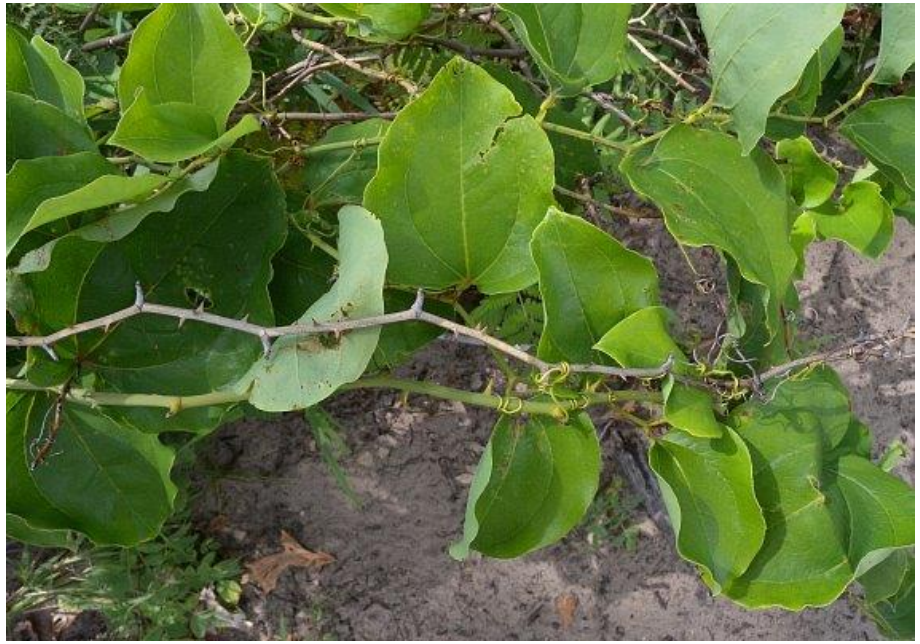
Weeping

Rounded

Irregular

Vines:

- A plant with a stem that aids its support by climbing, creeping, or twining along a surface.
- They can have tendrils or anchors which cling to another structure for support.



Smilax rotundifolia

Lonicera sempervirens

Herbaceous:

- A vascular plant lacking woody stems above the ground.
- They may be perennial, biennial or annual in their growth cycle.
- Herbaceous plants usually have seasonality and die back at certain times of the year (i.e. Winter, Spring ephemerals).
- Most are understory however some can get quite tall (Giant cane *Arundinaria gigantea*)

Fern and Fern Allies: Pteridophytes

- Ferns and their allies do not have flowers or seeds and propagate via spores.
- Ferns all have leafy fronds, but fern allies may have stems (*Equisetum hyemale*).
- Ferns are extremely varied in form, characteristics and habitat.
- There are evergreen (*Polystichum acrostichoides*), aquatic (*Azolla caroliniana*), climbing (*Lydodium palmatum*), epiphytic (*Platycerium bifurcatum*), and terrestrial ferns.
- Some ferns are aquatic/wetland types while others are scree and alpine forms.

Sedge/Grass/Rush:

- Sedges – 5K plus species and 90 plus genera
  - Difficult to identify w/o fruit or fruiting structures
- Monocotyledonous plants with parallel veining
- Sedges “have edges”, Rushes “are round”, Grasses “have joints or nodes”.

The Weirdos !

Plantsurfer

Female (left) and male (right) gametophytes of the dioicous liverwort Marchantia polymorpha

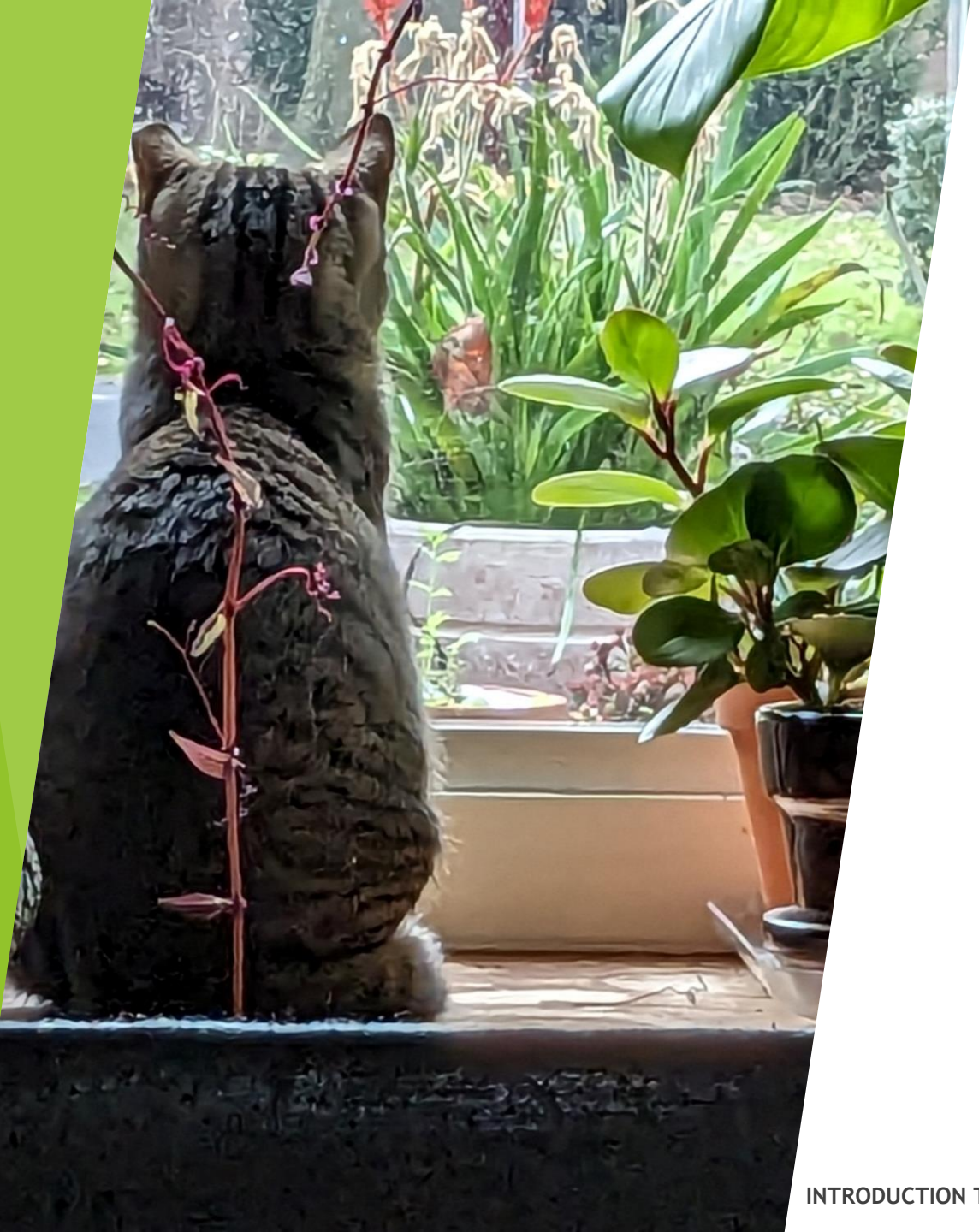
- Bryophytes – non-vascular
  - Liverworts; Hornworts; Moss (Bryophyta)
- Algae
- Fungi (plant? Or animal?)
- Lichen (alga or fungi?)

Collecting species for analysis

- In-situ or photograph is preferable.
- Collecting –
  - Woodies (tree/shrub) - Sample Branch/Stem with leaves, fruit, buds, etc.
  - Herbaceous –
    - Make sure they are not rare or threatened/endangered (T/E).
    - Collect only if there is a population of ten (?) or more.
    - Obtain complete specimen – fruit/flowers/basal and other leaf types/reproductive parts.
    - Press ASAP in hot weather; or place in sealed plastic bag.
    - Document location information (habitat, date, photo, label).

Equipment for the Field

- Hand lens, 10x
- Plastic bags with seal
- Digging tool/spade
- Knife
- Pruning shears
- Write-in-the-rain note pad and pen
- Waterproof marker
- 6” ruler with mm scale
- Camera/phone for photos
- Plant press (?) – in vehicle



Questions or Clarifications ?

This completes Module #1 of an "Introduction to Plant Identification"

- Module #2 will focus on specific plant parts such as buds, flower, leaf structure, and fruits to refine identification and distinguish between species.
- This series is being taped and will be available to serve as a refresher or for those unable to attend the "live" web course.
- Thank you for joining us for today's training session, Module #1, an "Introduction to Plant Identification"