Buzzards Bay NEP/MACC Introduction to Wetland Delineation: Vegetation

Marion Town House
September 13, 2014
8:00 – 4:00 PM

This workshop is a cooperative venture between the Buzzards Bay National Estuary Program, BBNEP, and the Massachusetts Association of Conservation Commissions, MACC. The BBNEP and MACC have been cooperating, coordinating, and conducting wetland delineation workshops together since 1992.

Regulations

"The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." -- Wetland Regulation 310 CMR 10.55(2)(c).

The delineation of wetlands is done in a regulatory context. The applicable regulation, 310 CMR 10.55(2)(c) together with **Wetlands Program Policy BVW**: Bordering Vegetated Wetland Delineation Criteria and Methodology, Issued: March 1, 1995, and the delineation manual "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act" provided clear guidance as to the proper way to delineate wetlands in Massachusetts.

Regulations

- "The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." -- Wetland Regulation 310 CMR 10.55(2)(c).

This workshop will focus on the evaluation of the vegetational community to determine if 50% or more of the community consists of wetland indicator plants using the DEP delineation manual.

Delineation Theory

Water Within 12 inches of the Surface Produce:

1. Wetland plant community

2. Wetland soil morphologies

3. Wetland plant adaptations

Wetlands have water at or near the surface for a sufficient time to produce anaerobic conditions in the upper part of the soil. The anaerobic condition is not noticeable directly in the field but it does produce changes in the soil morphology and plant community that can be observed. The plant community observations and soil morphologies are used to delineate wetland regardless of season.

Four Steps to Wetland I.D.

1. Plant I.D.

2. Plant Designation as a Wetland Plant

3. Determination of Abundance

4. Confirmation of Hydrology

The plant community criteria is determined by species composition, plant abundance and wetland plant indicator status. Confirmation of hydrology is largely done by the use of soil morphology.

Four Steps to Wetland I.D.

1. Plant I.D.

2. Plant Designation as a Wetland Plant

3. Determination of Abundance

4. Confirmation of Hydrology

This presentation will focus on the first three steps in wetland identification.

1. Plant Identification

Use a "key to determine the plant ID. Separate field guides may be needed for:

- Trees,
- Shrubs,
- Wild flowers,
- Ferns, and
- Grasses and grass-likes.

Unfortunately, there is no one book that will identify all plants well for the beginner. Magee's book, Field Guide to Wetland Plants, does list the more common wetland plants. Plant guides are available from MACC and of course, online. They can cost anywhere from $4.00 to $25.00. Sometimes you can find them at used bookstores. Buy one you can use.1

1.Below is a list of field guides available through your local bookstore. These books are often available in used bookstores at substantial discounts.

Brown, L. 1979. Grasses. Houghton Miffin, Boston. 240 pp.

Buckley, A. and T.O. Hendrickson. 1996. Native Trees, Shrubs and Woody Vines of Cape Cod and the Islands. University of Massachusetts Dartmouth. 70 pp.

Campbell, C. S., F. Hyland, and M.L.F. Campbell. 1975. Winter Keys to Woody Plants of Maine. University of Maine Press, Oromo, Maine. 52 pp. + plates.

Cobb, B. 1963. A Field Guide to the Ferns. Houghton Miffin, Boston. 281 pp.

Little, E.L. 1980. The Audubon Society Field Guide to North American Trees. Alfred A. Knoph, New York. 714 pp.

Peterson, R. T. and M. McKenny. 1968. A Field Guide to Wildflowers. Houghton Miffin, Boston. 420 pp.

Petrides, G.A. 1958. A Field Guide to Trees and Shrubs. Houghton Miffin, Boston. 428 pp.

Reddington, C.B. 1994. Plants in Wetlands. Kendall/Hunt Publishing, Dubuque, Iowa. 393 pp.

MAD-CAP

- Maples,
- Ashes,
- Dogwoods, and
- Caprifoliaceae. Locally, plants of the Caprifoliaceae family includes Viburnums, Honeysuckles, and elderberry.
- "Sedges have edges, Rushes are round". (While there are upland sedges and rushes, they should be considered guilty (of wetness) until proven innocent.)

You can use the "MAD-CAP" phrase to narrow down what you're looking for. Its easy to remember, and has some utility.

Most field guides, as opposed to technical manuals, have a series of dichotomous keys to identify the plant. These keys ask a series of "either-or" questions about easily recognizable features. Each step along the way, the possibilities are narrowed for the plant you are holding.
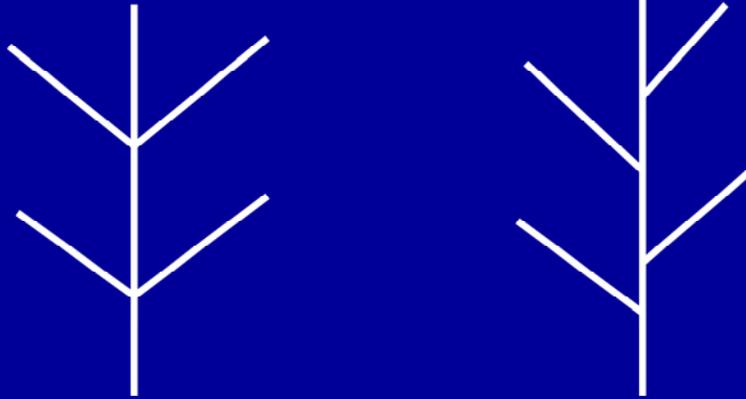
The opposite/alternate question refers to the leaf arrangement on the stem.
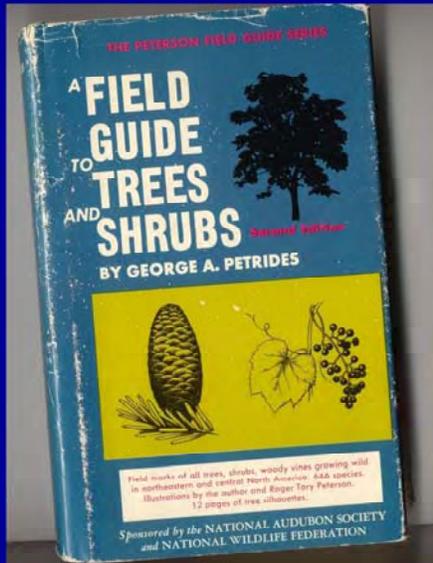
We will be identifying a tree using the Field Guide to Trees and Shrubs.

This is a useful tree guide that is available used. Some folks prefer The Audubon Society Field Guide to North American Trees, but it does not have the shrubs. Perhaps the most comprehensive easy to read tree guide is The Sibley Guide to Trees or The Tree Identification Book and the companion The Shrub Identification Book. But those two are rather large and can be difficult to take out in the field.

Photo: Field Guide to Trees and Shrubs. George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

When in doubt, read the table of contents.

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00
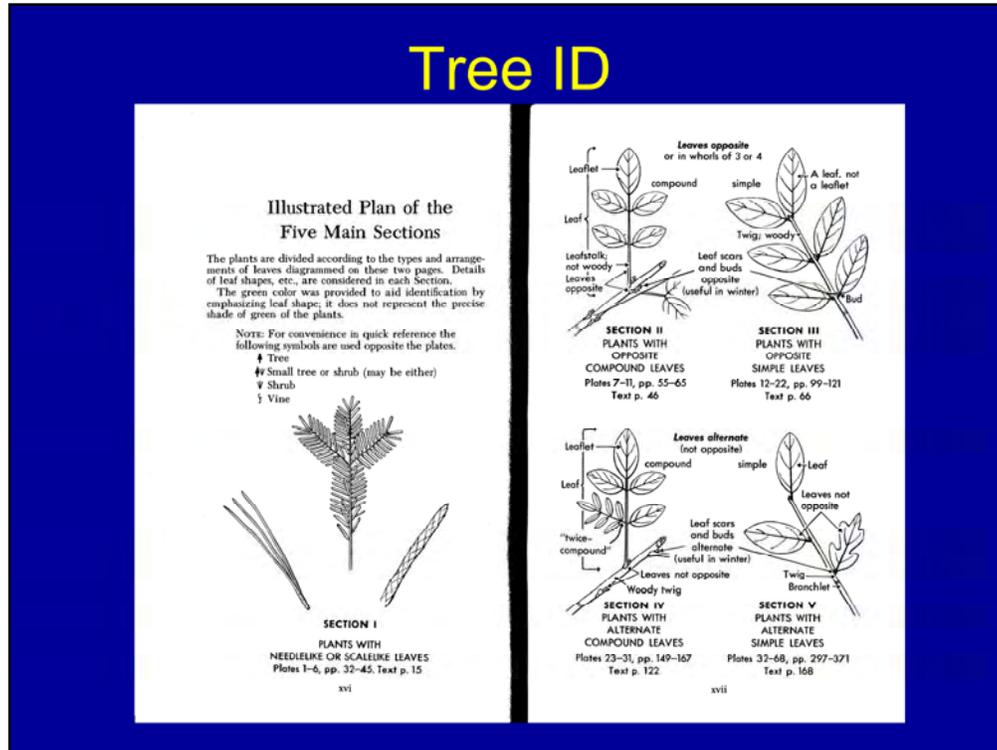
This particular guide has five main sections. Most guides have illustrative pages describing the terms used. You don't have to know anything to get started.

These are pages xvi and xvii of the second edition. (The first edition does not have this illustration, but can be found in the text of page xvii.)

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

Tree ID
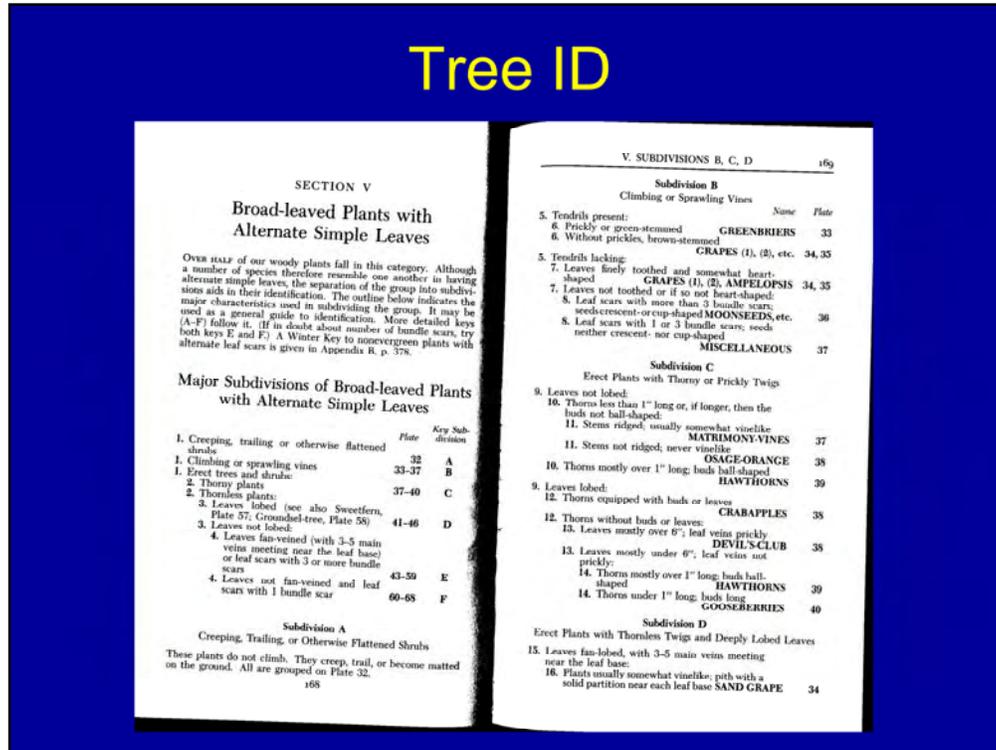
The particular sample we are looking at is found in Section V, Broad-leaved Plants with Alternate Simple Leaves. Each division, or group of questions will lead to a choice. Here, choice 1 leads to choice 2 which leads to choice 3. Then it's on to Subdivision D.

Second edition look to page 168, older editions go to page 98.

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

Tree ID

HOW TO USE THIS BOOK

Upper drawing: Compound leaf and twig
Lower drawing: Simple leaf blade, twig, etc.

Compound Leaflet · Pinna · Leaflet · Stipule · Tip · Wavy-edged · Twig · End-bud scar · Branchlet · Fine-toothed · Sinus · Coarse-toothed · Lobe · Vein · Single-toothed · Midrib · Double-toothed · Leaf Base · Gland · Leafstalk · Bud · Stipule · Bundle Scar · Leaf Scar

LEAF AND TWIG TERMINOLOGY
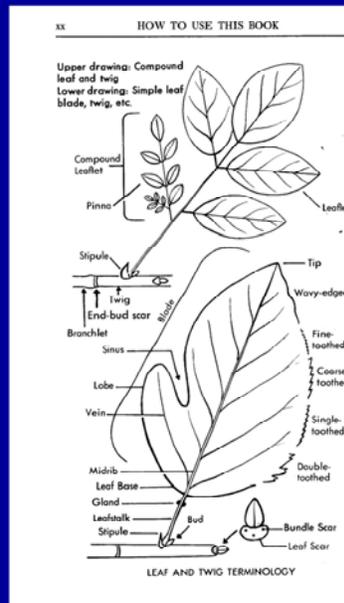
The section "How to Use This Book" has some useful information; glancing over these sections helps when you are try out find out what certain terms mean. This section will help you determine the difference between a simple and compound leaf, and just what a lobe is.

Go to page xx to find this illustration in the second edition, for older editions, xviii.

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00
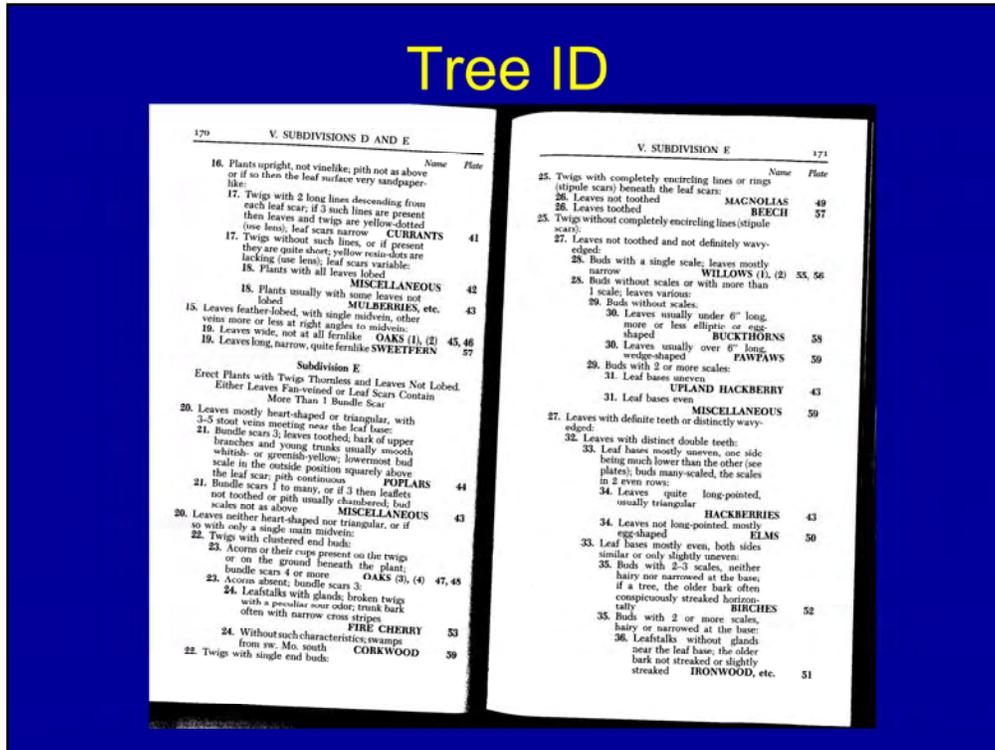
I5 leads to 19.

Choice 19 has sweetfern as one possibility. I always like to check out these outliers to make sure we don't have one.

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

Tree ID

Sweetfern is shown on the plate on the right (middle left). Clearly we don't have a sweetfern, so that only leaves the oaks on plates 45 and 46.

For the illustration in the second edition, plate 57 is on page 348, for older editions go to page 266.

Photo: Field Guide to Trees and Shrubs. George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

Tree ID
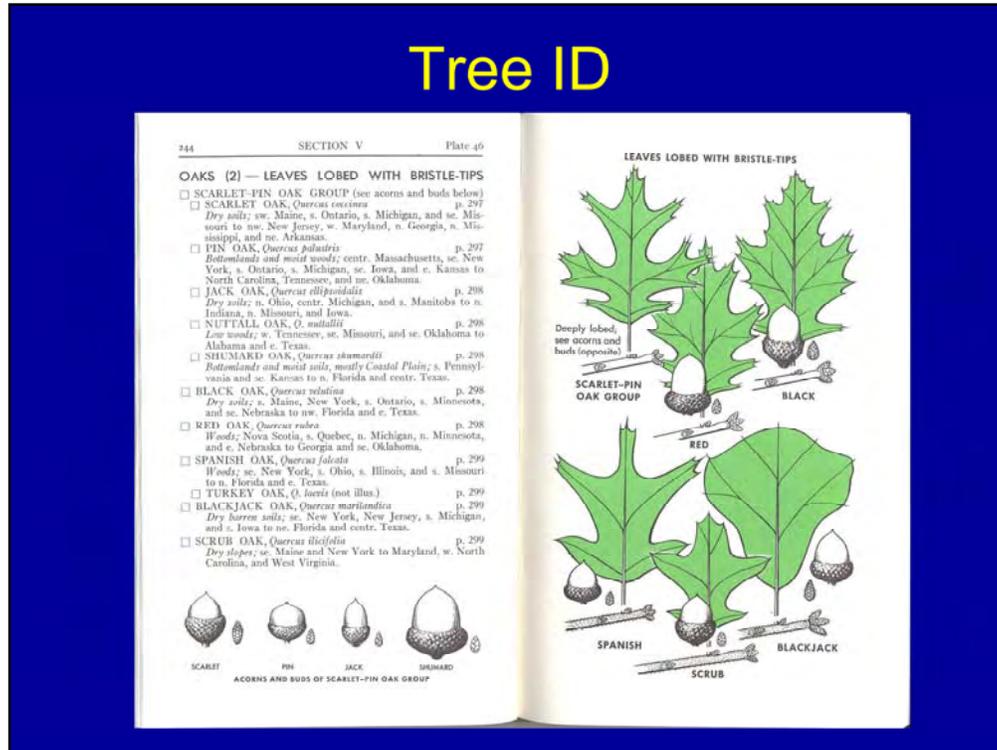
Looking at plate 46, and the description on the top of the opposite page, "Oaks (2) – Leaves lobed with bristle-tips," one can look at the sample and tell it's not the right page.

For the illustration in the second edition, plate 46 is on page 326, for older editions go to page 244.

Turn to Plate 45.

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01
to $19.00

Tree ID
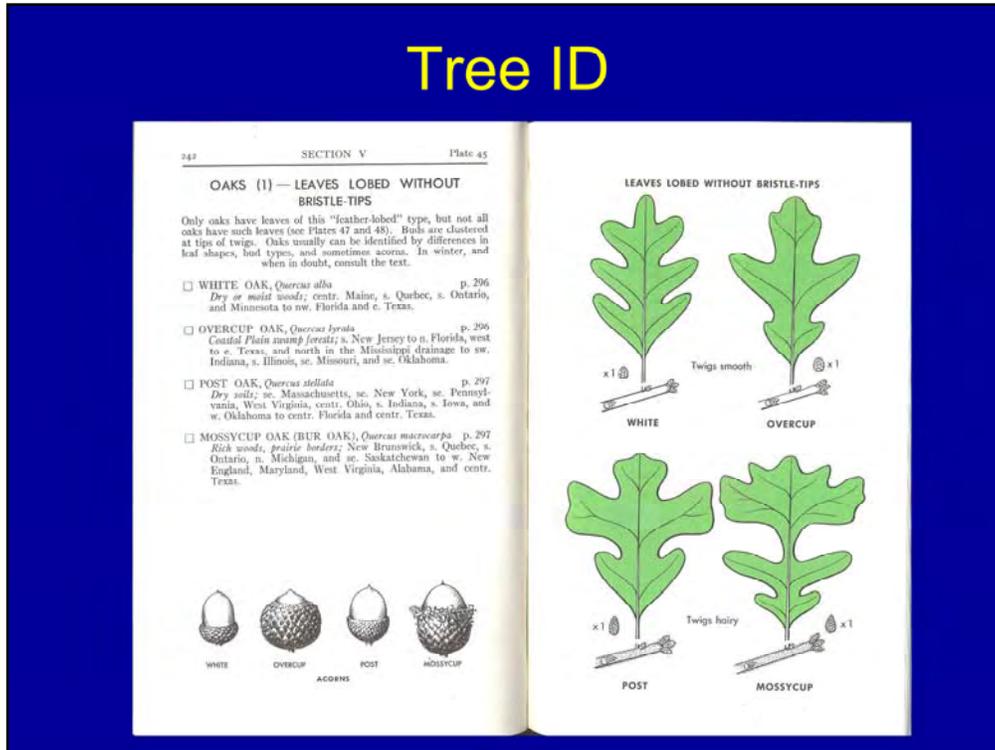
Look at your sample and the leaf illustrations. Also check out the habitat ranges to make your ID. Hey, it a white oak!

For the illustration in the second edition, plate 45 is on page 324, for older editions go to page 242

Photo: <u>Field Guide to Trees and Shrubs.</u> George A. Petrides, author. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $6.01 to $19.00

Fern ID
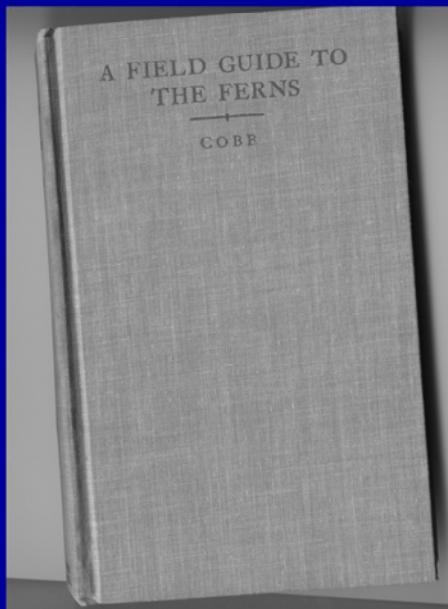
Ferns can be confusing, but lets get started. I like the Peterson Field Guide,
<u>A Field Guide to the Ferns</u>. This guide has been updated and expanded from
260 plus pages to over 400. This guide is the reference for the "Buzzards
Bay National Estuary Program Pocket Guide to Common Ferns for
Delineating Bordering Vegetated Wetlands in Massachusetts."

Photo: <u>A Field Guide to the Ferns.</u> Broughton Cobb, Elizabeth Farnsworth
and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently
available new or used prices, range from $9.89 to $20.00

Fern ID

ONCE–CUT FERNS   21

Leaflet or Pinna

Lower section of leaves or fronds, showing how they are cut once into leaflets or pinnae

Leaflet or Pinna

Leaf Shapes
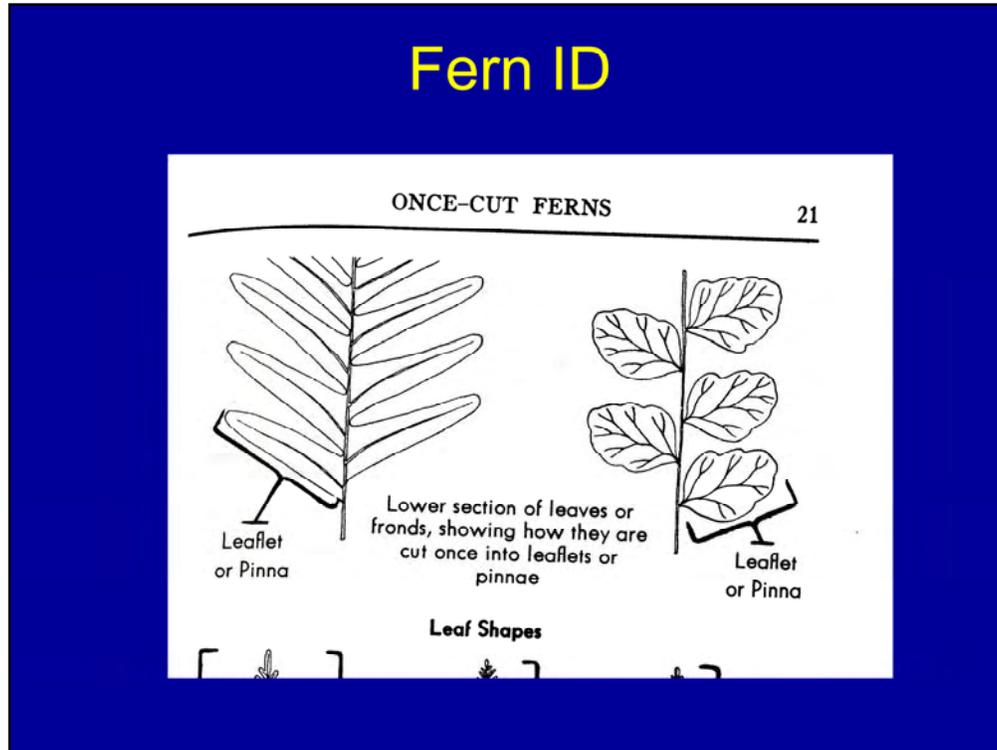
I like this guide because of its simple non-scientific breakdown of ferns for ID. Also you never have to remember anything. This is an example of a "once cut fern." See sensitive fern for an example.

Photo: A Field Guide to the Ferns. Broughton Cobb, Elizabeth Farnsworth and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $9.89 to $20.00
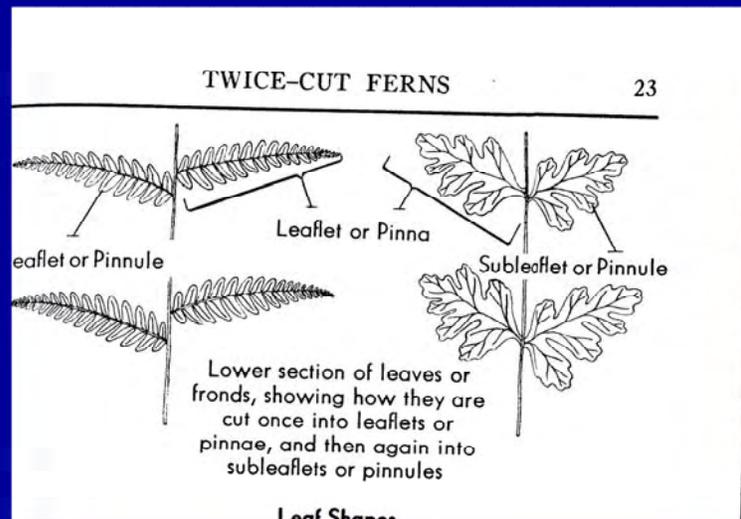
Now here is an example of a "twice –cut " fern. Look at pictures of an interrupted fern on the internet for a good example of this.

Photo: A Field Guide to the Ferns. Broughton Cobb, Elizabeth Farnsworth and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $9.89 to $20.00

Fern ID

THRICE-CUT FERNS

p. 158

p. 144

p. 146

p. 62

Subleaflet or Pinnule

Leaflet or Pinna

Subleaflet or

Lobe

Lower section of leaves or fronds, showing how they are cut once into leaflets or pinnae, a second time into subleaflets or pinnules, and then cut still a third time into lobes
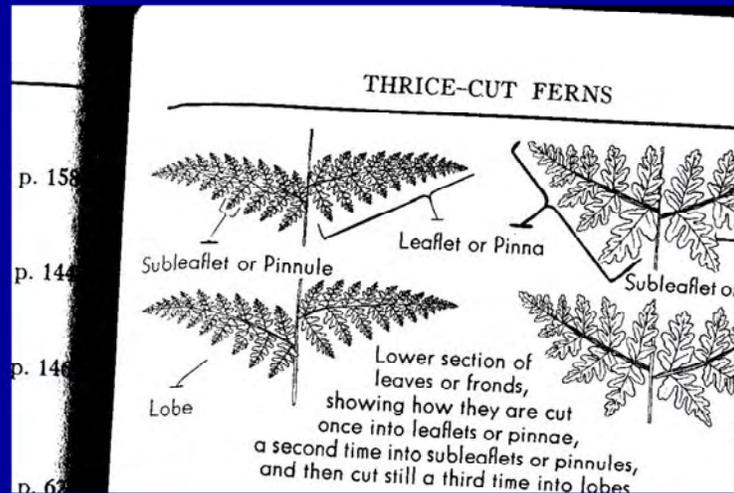
This is an illustration of a "thrice-cut" fern, or a "lacy" fern. Look for wood fern on the net for a pic of this.

Photo: A Field Guide to the Ferns. Broughton Cobb, Elizabeth Farnsworth and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $9.89 to $20.00

Fern ID
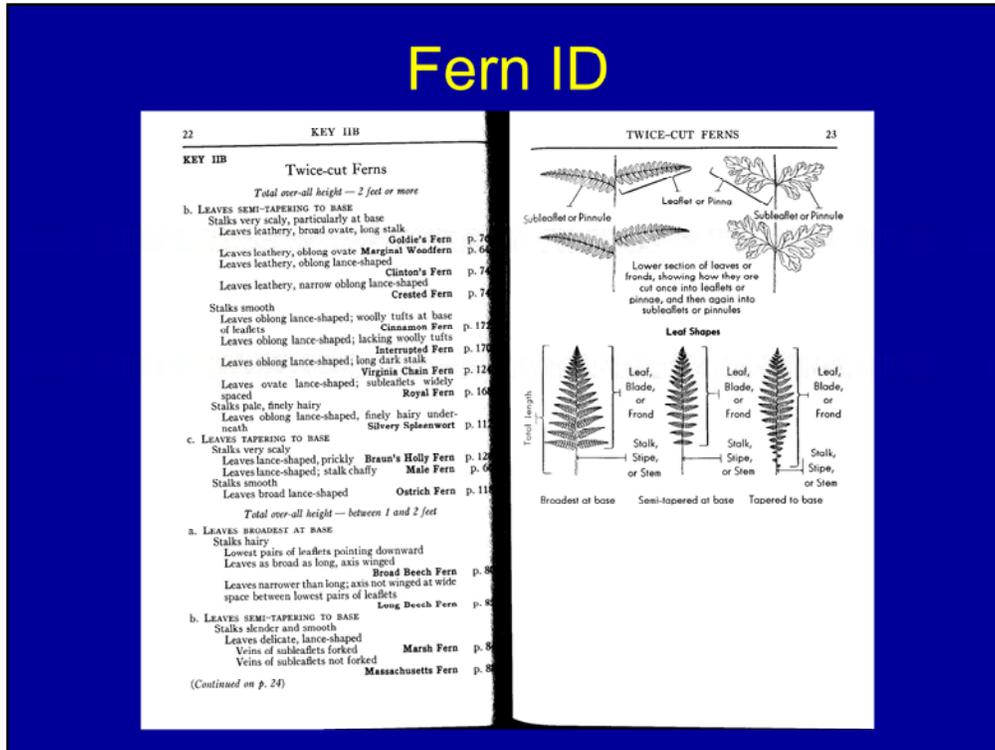
Now lets ID our fern. Look at the fern. Now look at the choices, once cut, twice cut, and thrice cut. Twice cut? Right.

Look at the fern and the "first choice on this page (height). Yes, its over two feet high. (I guess we should tape a tape measure next time, huh?)

Now look at the secondary choice, shape. There are shape examples on the right page. Pick one (Semi-tapering to base)

Make a final choice based on the short descriptions of the four ferns. (Cinnamon fern)

Photo: A Field Guide to the Ferns. Broughton Cobb, Elizabeth Farnsworth and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $9.89 to $20.00
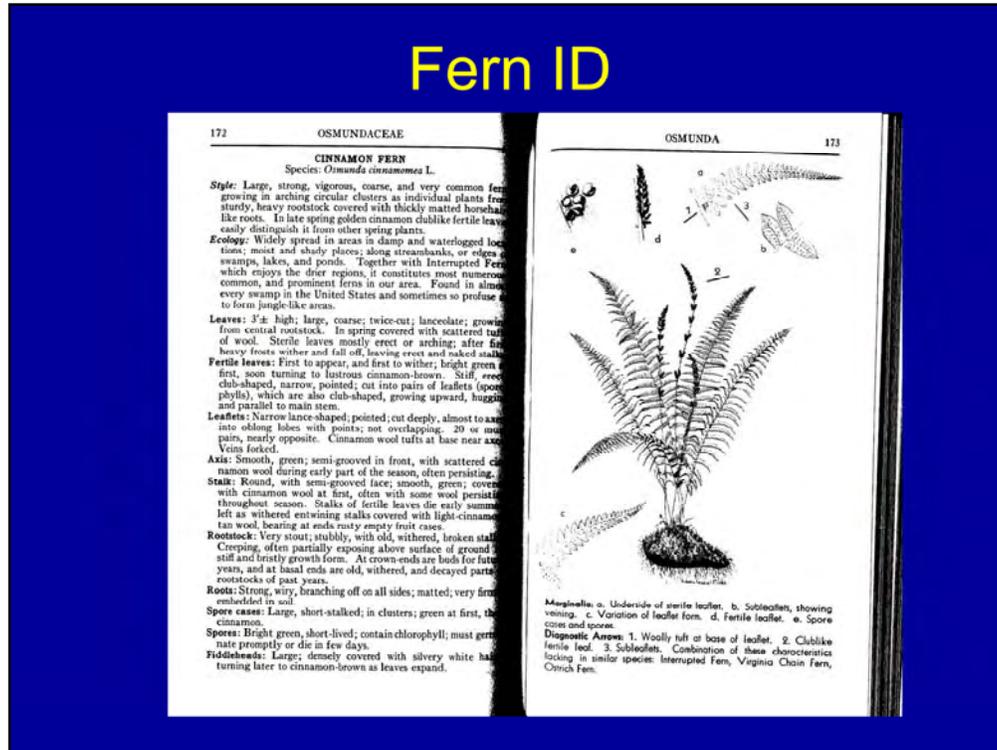
Now, verify other characteristics on the description page for cinnamon fern. (All that fuzzy brown hair.)

Photo: <u>A Field Guide to the Ferns.</u> Broughton Cobb, Elizabeth Farnsworth and Cheryl Lowe, authors. Hough Mifflin Company, Publisher. Currently available new or used prices, range from $9.89 to $20.00

Know These Plants!!

Trees:

Red maple

Tupelo

Atlantic White cedar

Canadian (Eastern)
Hemlock

There are some trees you should just memorize. Pick the top 5 for your area and just go over and over them until they are old friends.

Know These Plants!!

Shrubs:

Sweet pepperbush

Northern arrow wood

Swamp azalea

High-bush blueberry

Same with shrubs. Memorize the most common in your area and learn to use the keys for the others.

Know These Plants!!

Ferns:

Sensitive fern

Cinnamon fern

Royal fern

These ferns you will see again and again, learn them. (They are also really easy to learn.)

Know These Plants!!

Grasses and Grass-likes:

Phragmites australis

Soft rush

Canada rush

Grasses can be tough, but these three are pretty common and will get you through a lot, and make you look like an expert.

Web Resources

The PLANTS database: http://plants.usda.gov/

Wetland Monocots of the USA:
http://plants.usda.gov/plantkeys/wetland_monocots/WETLAND_MONOCOTS.html

MEKA Homepage: http://ucjeps.berkeley.edu/meacham/meka/

Go Botany (NEWFS): http://www.newenglandwild.org/gobotany

CBS: http://www.ct-botanical-society.org/docs/index.html

Here are some useful web site for plant ID. Program them into your phone or laptop. There are more useful web sites listed in your handout.

2. Plant Designation as a Wetland Indicator

- All plants <u>specifically</u> listed in the Wetlands Protection Act.
- All Plants listed in the USFWS plant list that are given an indicator status of:

OBL	FACW+
FACW	FACW-
FAC+	FAC

- All plants in the genus *Sphagnum*.
- Plants with morphological adaptations to wet conditions.

Only eastern hemlock, *Tsuga canadensis,* is listed in the Wetlands Act but not rated OBL, FACW+, FACW, FACW-, FAC+, or FAC.

Most common morphological adaptation would be a shallow root system as evidenced by numerous blow-downs. For example, if you are in an area that has numerous white pine, *Pinus strobus*, blow downs showing a shallow root system, the remaining white pines can be considered wetland indicators despite their USFWS indicator status of FACU.

In Massachusetts, the "National List of Plant Species That Occur in Wetlands: Massachusetts 1988" Plant List is considered the correct list. This is available for download at the Buzzards Bay National Estuary Program website, www.buzzardsbay.org

Indicator Categories:

Obligate Wetland (OBL). Occur almost always (estimated probability, >99%) under natural conditions in wetlands.

Facultative Wetland (FACW). Usually occur in wetlands (estimated probability, 67%-99%). but occasionally, found in non-wetlands.

Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability, 34%-66%),

Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability, 1%-33%).

Obligate Upland (UPL). Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in Massachusetts. If a species does not occur in wetlands in any region, it is not on the National List.

This system was developed in 1986 to describe plants affinity, or fidelity, to wetlands.

Indicator Categories:

OBL (estimated probability, >99%)

FACW+

Facultative Wetland (FACW). (estimated probability, 67%-99%)

FACW-

FAC+

FAC (estimated probability, 34%-66%)

FAC-

FACU+

FACU (estimated probability, 1%-33%)

FACU-

UPL (estimated probability <1%)

The pluses and minuses were added in 1988 to:

 1. better describe the actual affinity or fidelity of a species to wetlands, or

 2. get unanimous agreement on indicator status by the review panel, or

 3. both 1 and 2.

 For federal delineations, the 1988 plant list has been replaced with a 2012 list.

If you want to view the indicator status as a wetter to dryer continuum (which it isn't), plants that are FAC or wetter are wetland indicators.

What are the USFWS ratings for the following common wetland plants?

Red maple

(Black gum) Tupelo

Atlantic white cedar

Canadian (Eastern) hemlock

Sweet (coast) pepperbush

Northern arrow wood

Swamp azalea

Highbush blueberry

Sensitive fern

Cinnamon fern

Royal fern

Phragmites australis

Soft rush

Canada rush

3. Determination of % wetland species

- Communities and growth forms
- Study area
- Abundance

Describing and measuring the community growth forms, study area and abundance of plants has been standardized in the DEP manual.

Communities and Growth Forms

- Trees, >20 feet high & > 5 inches dbh
- Saplings, > 20 feet high & >0.4 but < 5" dbh
- Shrubs, >3 but <20 feet high
- Ground Cover, <3 feet high & all non-woody
- Climbing Vines, > 3 feet high

Use these break points (as outlined in the DEP manual and the BBNEP pocket guide) to describe species composition.

You may have several species in several layers.

For example you may find short pine seedlings 2 feet in height. These would be considered ground cover as they are less that 3 feet high. You may also observe pines 5-6 feet high, these would be in the shrub layer.
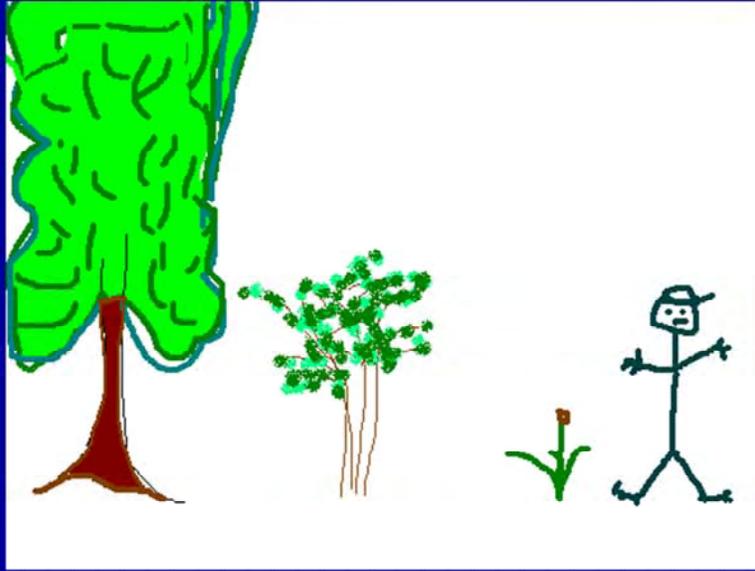
Most of the time, you will see obvious breaks in the vegetative layers and don't have to get out there with a tape measure (but you should have that tape measure).

Study Area

The Study area is the area of interest.

It is rarely the 30 foot circles in the DEP Guide.

You want to look at the area you are curious about. When describing a piece of land to determine if it is wetlands the 30 foot circle helps, but when checking a line there are some problems.
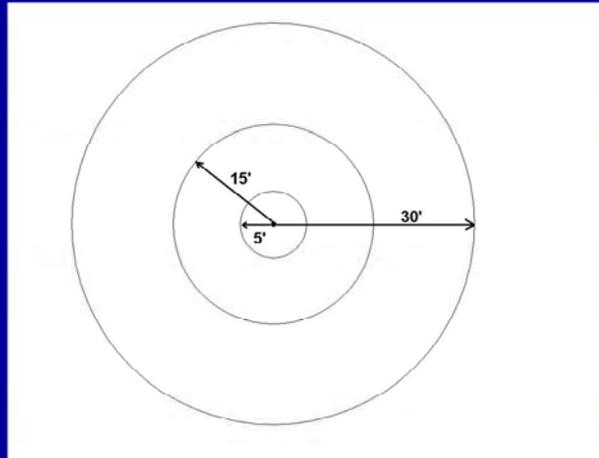
The study area for determining if a piece of land is wet is done by sampling. Samples should be representative. (not random!) Sample size is dependent of vegetative layer.

DEP Study Area Problems

Am I in a wetland? - What are the characteristics of this wetland?

Where is the wetland edge?

Which flag is correct?

These are all different questions. The study area for each question is different. Think about what you want to know, and what you have to look at to answer your question.

Two 30 foot study plots will provide information to answer the first question.

A look at just the disputed area will answer the last question.
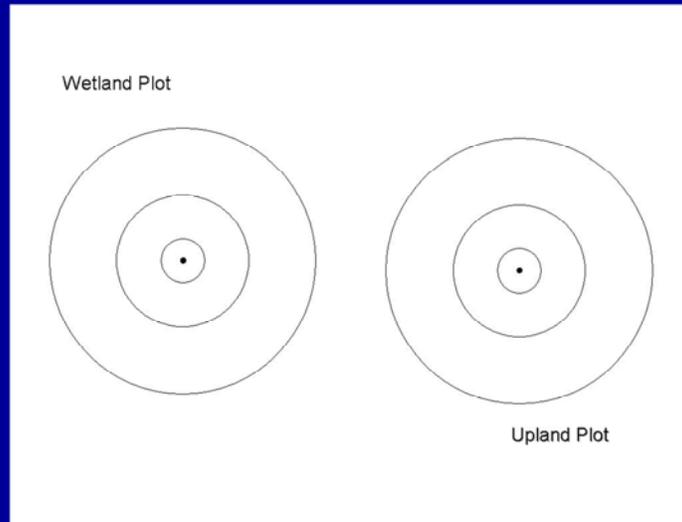
When you have established a wetland and upland plot, you are then going to use the information to hang a wetland flag.
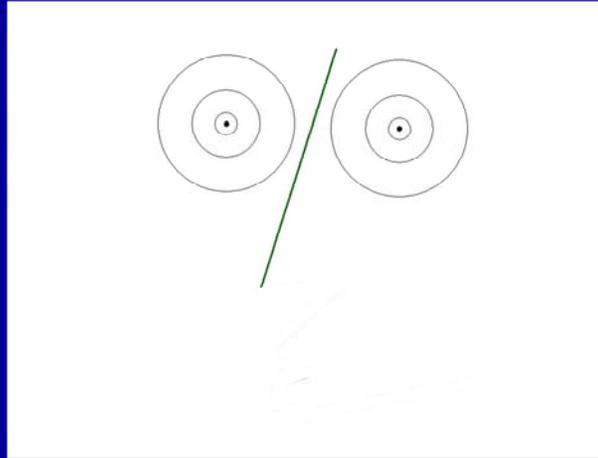
So you can do something like this, or…..
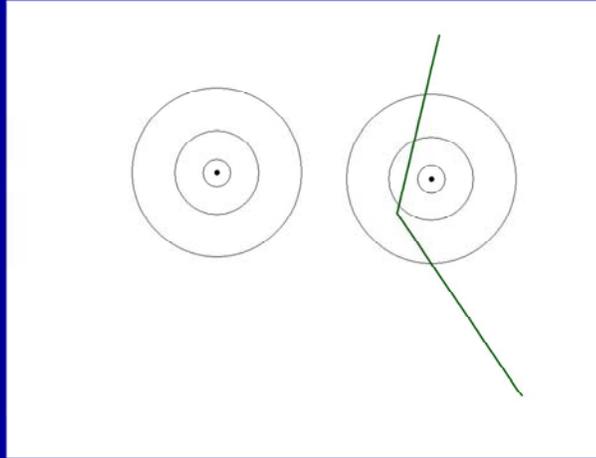
Something like this. Which presents problems because both wetland lines are using the same data sheets.

When hanging or checking checking a flag, you should be able to stand at the flag location, visualize the wetland line and compare your theoretical side A to side B.

Study Area Reality

More likely you will have two conflicting wetland lines . The green line in the photo above is the consultant flagging, the red line was placed by the Conservation Agent.

Aerial Photo: Mass GIS

Study Area Solution for Flag Review

50 0 50 100 Feet

Aerial Photo: Mass GIS

I look at the area between the two sets of flags in all layers to fill out a DEP data sheet. When comparing lines, the disputed area should be the area of interest and the area you analyze.

Aerial Photo: Mass GIS

Estimating Abundance
Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0

Abundance is done for each species in each layer, by estimating aerial coverage. Each cover range has a corresponding midpoint that you will record. The ranges and midpoint are on the BBNEP improved DEP data sheet.

Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0
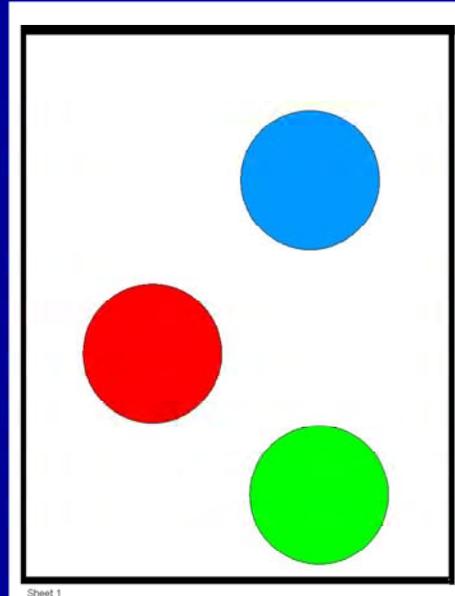
Estimate the % cover of each "species" within the plot area (the black lines).
Answers below are the actual cover %, not the range midpoint.

Red 6.5 %
Blue 6.5%
Green 6.5%

Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0
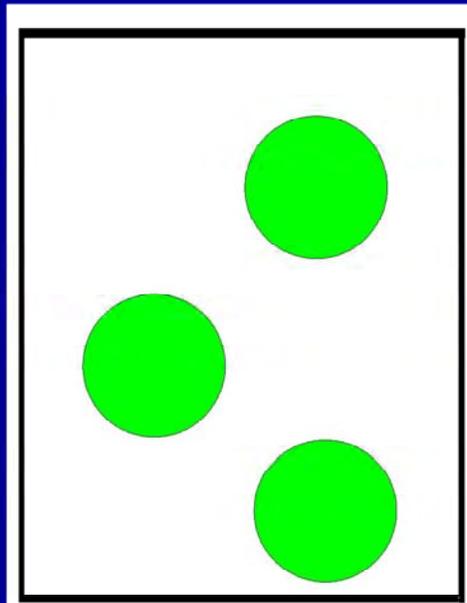
Estimate the % cover of each "species" within the plot area (the black lines). Answers below are the actual cover %, not the range midpoint.

Green 20%

Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0
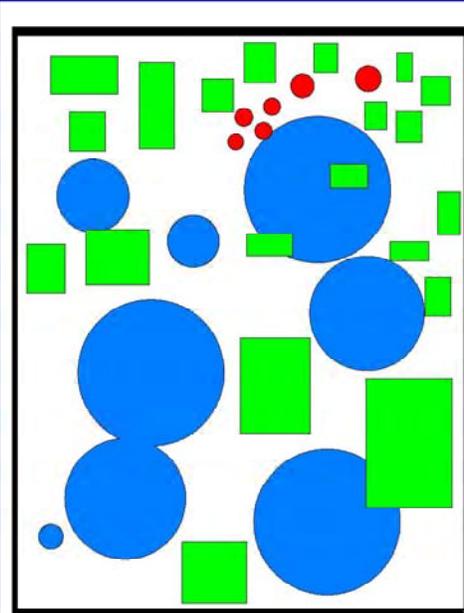
Estimate the % cover of each "species" with the plot area (the black lines). Answers below are the actual cover %, not the range midpoint.

Red <1 %
Blue 31%
Green 17%
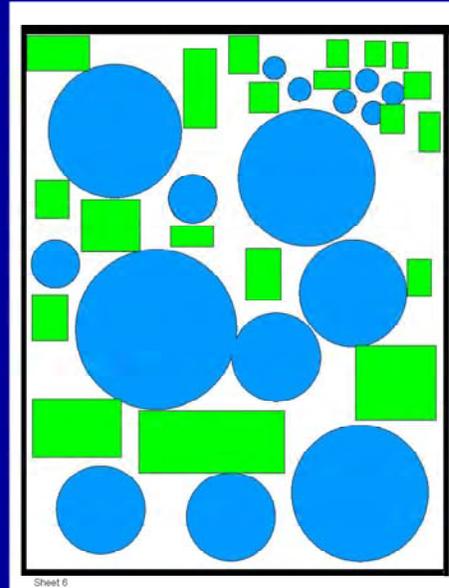
Estimate the % cover of each "species" within the plot area (the black lines). Answers below are the actual cover %, not the range midpoint.

Blue 43%

Green 18%

Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0
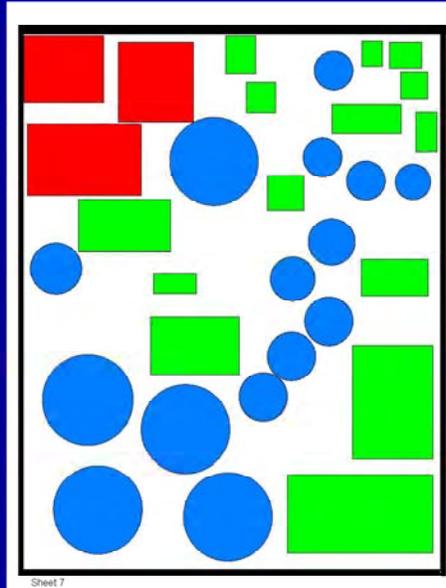
Estimate the % cover of each "species" with the plot area (the black lines). Answers below are the actual cover %, not the range midpoint.

Red 9 %

Blue 21%

Green 19%

Determining the % Plant Cover

Cover Range	Ranges Midpoint
1-5%	3.0
6-15%	10.5
16-25%	20.5
26-50%	38.0
51-75%	63.0
76-95%	85.5
96-100%	98.0
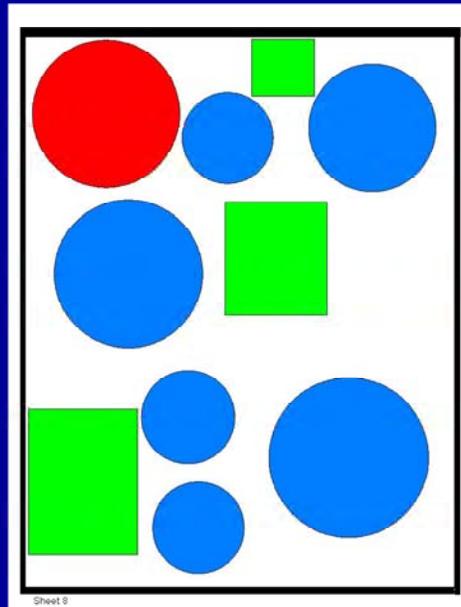
Estimate the % cover of each "species" with the plot area (the black lines). Answers below are the actual cover %, not the range midpoint.

Red 7 %
Blue 29%
Green 13%
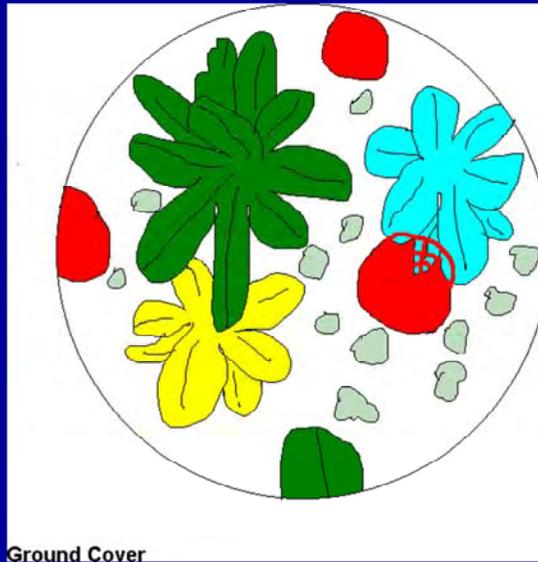
Here is a sample plot with five species in the ground cover.

Fill out the DEP data sheet.

List the most abundant species first.

DEP Data Sheet, Sample Layer & Species

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)
G/Starflower/*Trientalis b.*	20.5
G/Lady fern/*Althterium F.*	10.5
G/Mullein/*Verbascum t.*	10.5
G/Red maple/*Acer r.*	10.5
G/Ground pine/*Lycopodium o.*	3

You should have something like this on your data sheet. Note how the vegetative cover is noted by the "G"
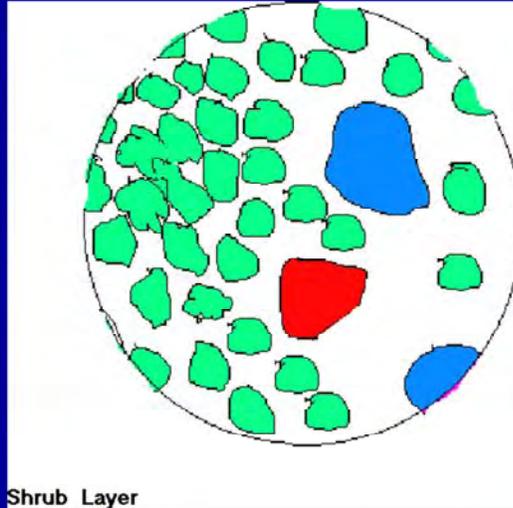
Now record the three shrub species, again in order of abundance with the most abundant species listed first.

DEP Data Sheet, Sample Layer & Species

A.	Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)
	G/Starflower/*Trientalis b.*	20.5
	G/Lady fern/*Althterium F.*	10.5
	G/Mullein/*Verbascum t.*	10.5
	G/Red maple/*Acer r.*	10.5
	G/Ground pine/*Lycopodium o.*	3
	Sh/Sweet pepperbush/*Clethra a.*	38
	Sh/N. arrowwood/*Viburnum r.*	10.5
	Sh/Red maple/*Acer r.*	3

Now if you're sharp you have something like this.
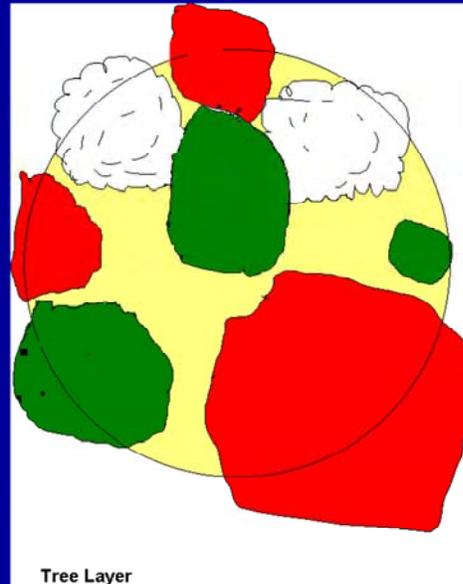
Now record the tree layer. Only count the trees that have the trunk in the study plot. Also don't count the area of the tree outside of the study plot.

DEP Data Sheet, Sample Layer & Species

G/Starflower/ *Trientalis b.*		20.5
G/Lady fern/*Althterium F.*		10.5
G/Mullein/*Verbascum t.*		10.5
G/Red maple/*Acer r.*		10.5
G/Ground pine/*Lycopodium o.*		3
Sh/Sweet pepperbush/*Clethra a.*		38
Sh/N. arrowwood/*Viburnum r.*		10.5
Sh/Red maple/*Acer r.*		3
T/Red maple/*Acer r.*		38
T/Green ash/ *Fraxinus p.*		20.5
T/White oak/ *Quercus a.*		20.5

Now you have collected all your field data and are about the learn why a pocket calculator (solar powered of course) is handy while doing delineations.

DEP Data Sheet - Percent Dominance

A. Sample Layer and Plant Species	B. Percent Cover	C. Percent Dominance
G/Starflower/ *Trinetalis b.*	20.5	
G/Lady fern/*Althterium F.*	10.5	
G/Mullein/*Verbascum t.*	10.5	
G/Red maple/*Acer r.*	10.5	
G/Ground pine/*Lycopodium o.*	3	
	55	

For each vegetative layer, Add all the coverages from the percent cover column

DEP Data Sheet - Percent Dominance

A. Sample Layer and Plant Species	B. Percent Cover	C. Percent Dominance
G/Starflower/ *Trinetalis b.*	20.5	37%
G/Lady fern/*Althterium F.*	10.5	19%
G/Mullein/*Verbascum t.*	10.5	19%
G/Red maple/*Acer r.*	10.5	19%
G/Ground pine/*Lycopodium o.*	3	5%
	55	

Now divide the sum (55) into each species percent cover to determine the percent dominance for that species (Column C)

DEP Data Sheet - Percent Dominance

A. Sample Layer and Plant Species	B. Percent Cover	C. Percent Dominance
Sh/Sweet pepperbush/*Clethra a.*	38	74%
Sh/N. arrowwood/*Viburnum r.*	10.5	20%
Sh/Red maple/*Acer r.*	3	6%
	51.5	

Do the same thing with the shrubs…

And the trees.

DEP Data Sheet - Dominant Plants

The 50/20 Rule

3 things

To determine if you have a dominant plant use the 50/20 rule.

DEP Data Sheet - Dominant Plants

1. Beginning with the most abundant species, list the plants in the layer until the cumulative total for percent dominance meets or exceeds 50 percent.

In some cases, this will only be one species; in other cases, several species may be needed to meet the 50 percent threshold. These species are dominant plants for the layer.

This is the "50" part.

DEP Data Sheet - Dominant Plants

2. Other species, not already listed, with a percent dominance of 20 percent or greater also are dominant plants and should be listed.

And this is the "20" part.

DEP Data Sheet - Dominant Plants

3. If additional species in the layer have the same percent dominance as any species already listed, those species also are dominant plants and should be listed.

I know you had some questions about matching numbers, well here's the answer.

DEP Data Sheet
Wetland Indicator Status

The indicator category is taken from the National List of Plant Species That Occur in Wetlands: 1988 - Massachusetts.

You can use the BBNEP pocket guide. Do not use a regional list, or the provisional 1996 list, or the new 2012 list.

Plant Designation as a Wetland Indicator

1. All plants specifically listed in the Wetlands Protection Act (Eastern hemlock, *Tsuga canadensis*).

2. All Plants listed in the USFWS plant list that are given an OBL, FACW+, FACW, FACW-, FAC+, and FAC indicator status.

3. All plants in the genus *Sphagnum*.

4. Plants with morphological adaptations to wet conditions.

You really don't have to remember this, it's on the BBNEP improved DEP data sheet.

Here is a real life sample from Mike O'Reilly, the Conservation Administrator in Dartmouth.

Cinnamon fern	9%
Fox Grape	1%
N.Y. fern	3%
Bracken fern	1%
Smilax glauca	3%
Swamp dewberry	6%

Edgewood Estates – Ground Cover

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: __Mo'Fun__   Prepared by: __J. Rockwell__   Project location: __Edgewood Estates__   File #: __18-18__

Check all that apply:

[XX] Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

[ ] Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

[ ] Method other than dominance test used (attach additional information)

Section 1. Vegetation   Observation Plot Number: __1__   Transect Number: __1__   Date of Delineation: 9-12-98

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
G/Cinnamon fern	10.5%			
G/Swamp dewberry	10.5%			
G/Smilax glauca	3%			
G/N.Y. fern	3%			
G/Fox grape	3%			
G/Bracken fern	3%			

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland Indicator plants: Number of dominant non-wetland Indicator plants:

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants?   yes   no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

1 - 5 = 3%,   6 - 15 = 10.5%,   16 - 25 = 20.5%,   26 - 50 = 38%,   51- 75 = 63%,   76 - 95 = 85.5%,   96 -100 = 98%

So now you have this.

Red Maple   80%

Black Cherry   20%

Edgewood Estates – Tree Layer

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: __Mo'Fun__   Prepared by: __J. Rockwell__   Project location: __Edgewood Estates__   File #: __18-18__

Check all that apply:

[XX]   Vegetation alone presumed adequate to delineate BVW boundary; fill out Section I only

[ ]   Vegetation and other indicators of hydrology used to delineate BVW boundary; fill out Sections I and II

[ ]   Method other than dominance test used (attach additional information)

Section 1. Vegetation   Observation Plot Number: __1__   Transect Number: __1__   Date of Delineation: 9-12-98

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
G/Cinnamon fern	10.5%			
G/Swamp dewberry	10.5%			
G/Smilax glauca	3%			
G/N.Y. fern	3%			
G/Fox grape	3%			
G/Bracken fern	3%			
T/Red Maple	85.5%			
T/Black Cherry	20.5%			

* Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland Indicator plants: Number of dominant non-wetland Indicator plants:

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants?   yes   no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

1 - 5 = 3%,   6 - 15 = 10.5%,   16 - 25 = 20.5%,   26 - 50 = 38%,   51 - 75 = 63%,   76 - 95 = 85.5%,   96 -100 = 98%

Adding the trees the form looks like this.

Sweet pepperbush   90%

Tupelo   4%

Northern arrowwood   2%

Swamp Azalea   2%

Sheep laurel   2%
Blue Beech or ironwood   1%

Edgewood Estates – Shrub Layer

To finish your field observations, you now have this.

Add the total of observation of percent cover for each layer then determine the Percent Dominance. Check the BBNEP Pocket Guide if you forgot how.

Edgewood Estates Dominant Plants

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Mo'Fun   Prepared by: J. Rockwell   Project location: Edgewood Estates   File #: 18-18

Check all that apply:

[XX] Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

[ ] Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

[ ] Method other than dominance test used (attach additional information)

Section 1. Vegetation   Observation Plot Number: 1   Transect Number: 1   Date of Delineation: 9-12-98

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
G/Cinnamon fern	10.5%	32%	Yes	
G/Swamp dewberry	10.5%	32%	Yes	
G/Smilax glauca	3%	9%	No	
G/N.Y. fern	3%	9%	No	
G/Fox grape	3% /	9%	No	
G/Bracken fern	3% / 33	9%	No	
T/Red Maple	85.5%	81%	Yes	
T/Black Cherry	20.5% / 106	19%	No	
Sb/Sweet pepperbush	85.5%	88%	Yes	
Sb/Tupelo	3%	3%	No	
Sb/N. Arrowwood	3%	3%	No	
Sb/Swamp azalia	3%	3%	No	
Sb/Sheep laurel	3%	3%	No	
Sb/Blue beech	1% / 97.5	1%	No	

* Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: Number of dominant non-wetland indicator plants:

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants?   yes   no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

1 - 5 = 3%,   6 - 15 = 10.5%,   16 - 25 = 20.5%,   26 - 50 = 38%,   51- 75 = 63%,   76 - 95 = 85.5%,   96 -100 = 98%

Now determine if the species is a dominant plant using the 50/20 rule.

Write down the USFWS rating for the dominant plants only and asterisk the wetland indicators.

Now make your determination based on vegetation.

Acknowledgements

- The Buzzards Bay National Estuary Program is solely responsible for the content of this program.
- The BBNEP has borrowed heavily from outside sources via the internet
- If you think the BBNEP has used your original content, contact us so we can give you credit.

Buzzards Bay National Estuary Program

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