Buzzards Bay National Estuary Program

Pocket Guide to Common Ferns for Delineating Bordering Vegetated Wetlands in Massachusetts

About the Buzzards Bay National Estuary Program

The Buzzards Bay National Estuary Program is an advisory and planning unit of the Massachusetts Office of Coastal Zone Management. We receive funding from, and are part of, the US Environmental Protection Agency's National Estuary Program. Created in 1985, the Buzzards Bay NEP completed a Comprehensive Conservation and Management Plan for the Bay in 1991. This plan is a blueprint for the protection and restoration of water quality and living resources in Buzzards Bay and its watershed. (The original plan is being updated; go to our New CCMP page, www.buzzardsbay.org/newccmp.htm, for more information.) Today, the Buzzards Bay NEP provides funding and technical assistance to municipalities and citizens to implement the recommended actions contained in the Management Plan.

The views or information contained here do not necessarily reflect the views of the Commonwealth of Massachusetts or the US EPA.

About the BBNEP Wetland Delineation Webpage

Since 1989, Buzzards Bay National Estuary Program Wetland Specialist, John Rockwell, has been training Conservation Commission members on how to delineate wetlands in cooperation with the Massachusetts Association of Conservation Commissions (MACC).

In addition to wetland delineation training with MACC, Mr. Rockwell has conducted delineation training for almost all the Conservation Commissions in the Buzzards Bay Watershed, in addition to Conservation Agents, Boards of Health and Realtors.

The BBNEP has posted all of the training materials it has developed on its Wetland Delineation page. There you will find useful links as well as the BBNEP wetland delineation training materials.

About Ferns

For more information on ferns and a more comprehensive guide, see A Field Guide to the Ferns, by Broughton Cobb.

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Cover Photo by: Arieh Tal

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Common Polypody (Rock Polypody)
Polypodium virginianum (Polypodium vulgare)
1988 USFWS Wetland Indicator Status: UPL (not listed)

- Family: Polypodiaceae
- Habitat: rich woods and open woods; usually on rocks or boulders
- Height: fronds 6-12 inches long
- Location of spores: underside of fronds
- Stipe (leaf stalk): ungrooved; smooth or scattered with thin light-brown scales
- Growth pattern: random
- Persistence: evergreen
- County Distribution: throughout

Photo by: Arieh Tal

This small evergreen fern grows on rocks, boulders and bedrock outcrops.

Common Polypody

Photo by: Catherine Taggart

This fern has a slender smooth green stalk and blunt-tipped leathery leaflets; green and smooth on both sides. The leaflets are winged at the axis (see photo below).

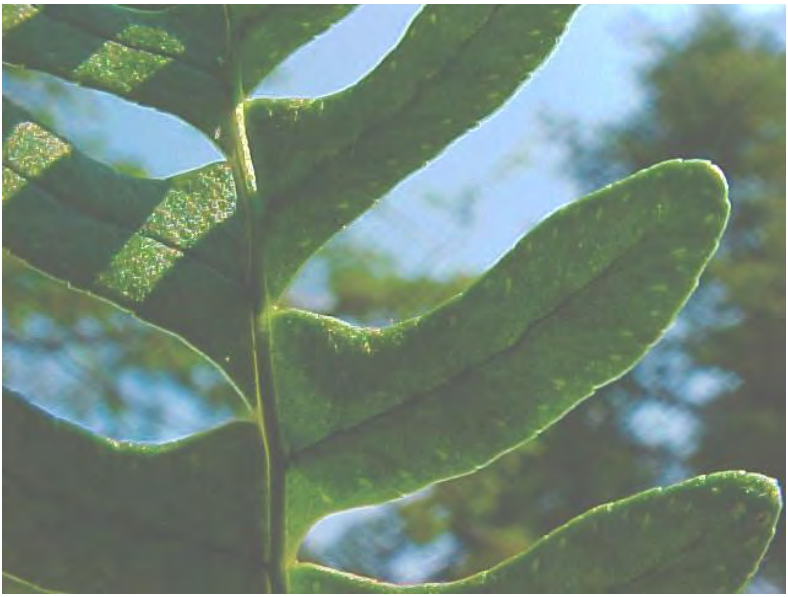


Photo by: Catherine Taggart

Common Polypody

Photo by: Dr. John Hilty, Illinois Wildflowers

Underside of a frond, showing the round sori (spore-bearing structures). Sori are yellow when young.

Photo by: Teresa Gallagher

Sensitive Fern
Onoclea sensibilis
1988 USFWS Wetland Indicator Status: FACW

Sensitive fern gets its name from the tendency of the fronds to wither at the first slight frost.

- Family: Dryopteridaceae
- Habitat: wet meadows and woods, swamps, streambanks; usually in slightly acidic soil
- Height: 18-24 inches
- Location of spores: on separate fertile fronds, within bead-like modified leaflets
- Stipe (leaf stalk): yellow or pale tan, dark brown at the base with a few scales
- Growth pattern: random
- Persistence: deciduous
- County Distribution: throughout

Photo by: Stacey Scarce, Acadiana Park Nature Station

Sensitive

Photo by: Catherine Taggart

The beaded fertile frond is green when new. The lower pairs of leaflets are widely spaced and stemmed. The margins (edges) of the sterile leaf are indented with smooth edges (not toothed). This is a “once-cut” fern.

Sensitive

Photo by: Dr. Kenneth J. Sytsma, Botany Department, University of Wisconsin, Madison

The fertile frond turns brown as it ages and can persist throughout the winter, making it easy to identify.

Woodwardia areolata
1988 USFWS Wetland Indicator Status: FACW+

- Family: Blechnaceaa
- Habitat: shade, swamps, wet woods
- Height: 2+ feet
- Location of spores: underside of separate fertile leaflet
- Stipe (leaf stalk): slightly grooved face, yellow green above, chestnut-brown at base
- Growth pattern: random
- Persistence: deciduous
- County Distribution: not Worchester

Photo by: Amy Richard, University of Florida

Netted Chain fern can be confused with Sensitive fern. Look for the fine toothed edges on the wavy leaflet margins, and the fertile leaf with the long, thin, and contracted leaflets on the Netted Chain fern. The leaves of the netted chain fern are more glossy than sensitive fern.

Netted Chain

Photo by: Amy Richard, University of Florida

Note the very fine teeth along the wavy margin.

Look at the photo and see that the leaflet does not disappear along the main stem (axis).

This is called a "winged axis." Netted chain fern will not have a winged axis on its lowest pair of leaflets.

Netted Chain

Photo by: Kimberly Rama Fleming

Fertile frond of the Netted Chain fern in fall. The fertile frond is green earlier in the year. Notice how long and thin the leaflets are. The back of the leaflets have a “chain” of fruit dots.

Christmas Fern
Polystichum acrostichoides
1988 USFWS Wetland Indicator: FACU-

Christmas fern stays green all winter; the fronds were formerly used for Christmas decorations. It is common and easy to identify from the shape of the fronds.

- Family: Dryopteridaceae
- Habitat: rich woods and open woods
- Height: fronds 2-3 feet long
- Location of spores: spores on undersides of leaflets
- Stipe (leaf stalk): stout, shallowly-grooved, with dense light-brown scales. leaflets dark green, shiny
- Growth pattern: asymmetric clump
- Persistence: evergreen
- County Distribution: throughout

Photo by: Dr. Gary Coté, Radford University, and Pathways for Radford

Christmas ferns grow in little bouquets of leaves. The leaves stand upright in the growing season, but often tend to lie down in the winter, as in the picture above, as if the plant needed to rest. The fern is green at Christmas, hence its name.

Christmas

Photo by: Dr. Gary Coté, Radford University, and Pathways for Radford

The leaflets near the top of the leaf are noticeably smaller than the leaflets further down, and there is an abrupt switch from the smaller to the larger leaflets. The smaller leaflets are fertile leaflets; if you flip them over you will find two or more rows of little brown dots, often crowded together and covering the entire underside of the leaflet. These are the fruitdots which produce the spores.

Christmas

Photo by: Kris Light

Spores on upper leaves of Christmas fern.

Royal Fern
Osmunda regalis
1988 USFWS Wetland Indicator Status: OBL

- Family: Osmundaceae
- Habitat: wet soil -- along streams and lakeshores, in bogs, and in wet meadows
- Height: 2-5 feet
- Location of spores: on fertile leaflets, which are at the ends of the fronds; they are initially green, turning light brown after release of the spores.
- Stipe (leaf stalk): smooth, slender, and pale green, tan, or pinkish
- Growth pattern: symmetric clump
- Persistence: deciduous
- County Distribution: throughout

Photo by: Missouri Botanical Garden PlantFinder

The unique shape of the frond makes Royal fern easy to identify.

Royal

Photo By: Missouri Botanical Garden PlantFinder

The fertile leaflets turn light brown after the spores have been released.

Royal

Photo by: Missouri Botanical Garden PlantFinder

The green fertile leaflets are located at the top of the leaf. The spores themselves are green and capable of photosynthesis. After the spores have been released, the fertile leaflets turn light brown.

Cinnamon Fern
Osmunda cinnamomea
1988 USFWS Wetland Indicator Status: FACW

- Family: Osmundaceae
- Habitat: swamps, streambanks, shores
- Height: 2-5 feet
- Location of spores: separate fertile fronds are cinnamon-colored, narrow and erect
- Stipe (leaf stalk): round and slightly grooved; at first covered with cinnamon-colored hairs, later smooth and green
- Growth pattern: symmetric clump
- Persistence: deciduous
- County Distribution: throughout

Photo by: Thomas G. Barnes, University of Kentucky.

This is a large fern and considered a prime wetland indicator in the Buzzards Bay watershed. At higher elevations throughout the state, the reliability of this species as a key indicator diminishes. Several observers have noted that the reliability of cinnamon fern as an indicator of wetness is inversely proportional to elevation above sea level.

Cinnamon

Photo by: Marc Bogonovich

Cinnamon fern can be confused with its cousin, Interrupted fern. On the back of the leaf, Cinnamon fern will have cinnamon colored wooly tufts at the base of the leaflet.

The fronds turn brown and dry out at the end of the season and can still be identified by the remnants of a cinnamon wool entwined around the dried stalks.

Cinnamon

Photo by: Richard A. Howard Image Collection, courtesy of Smithsonian Institution. R.A. Howard @ USDA-NRCS PLANTS Database

The club-like fertile fronds are a cinnamon color.

Interrupted Fern
Osmunda claytoniana
1988 USFWS Wetland Indicator Status: FAC

Interrupted fern gets its name from the brown fertile leaflets, which "interrupt" the green sterile leaflets on the larger fronds.

- Family: Osmundaceae
- Habitat: rich, mesic woods and open woods; shaded roadsides
- Height: fronds 2-4 feet long
- Location of spores: in middle of fertile leaflets
- Stipe (leaf stalk): round in cross-section, sometimes bearing fuzzy tufts, ungrooved
- Growth pattern: symmetric clump
- Persistence: deciduous
- County Distribution: not in Dukes


Photo by: Circeus

Interrupted

Photo by: Andree Sanborn, Meeyauw's Photo a Day

Interrupted fern has the same look and texture of cinnamon fern.

Interrupted

Photo by: Emily B. Sessa, University of Wisconsin-Madison

The fertile leaflets are taller and more erect than the sterile leaflets.

New York Fern
Thelypteris noveboracensis (Parathelypteris noveboracensis)
1988 USFWS Wetland Indicator Status: FAC

This is a common fern, and it often grows in large colonies that carpet the forest floor. Notice how the frond tapers toward the base, and the lowest leaflets are very small. This is a good marker for New York fern.

- Family: Thelypteridaceae
- Habitat: moist woods in filtered light
- Height: 1-2 feet
- Location of spores: underside of fronds (see 3rd photo)
- Stipe (leaf stalk): smooth or slightly hairy, pale green above, brown and scaly at the base
- Growth pattern: random
- Persistence: deciduous
- County Distribution: throughout

Photo by: Catherine Taggart

Note how the frond tapers at both ends, and the lowest leaflets are very small.

New York

Photo by: Catherine Taggart

Notice the taper. A common axiom to remember this fern is “when in New York, we always burn the candle at both ends.”

New York

Photo by: Catherine Taggart

Under-side of New York fern leaf showing sori.

Marsh Fern

Thelypteris palustris (Thelypteris thelypteroides, Dryopteris thelypteris)
1988 USFWS Wetland Indicator Status: FACW+

- Family: Thelypteridaceae
- Habitat: edges of marshes and wet meadows, ditches, or woods; usually in rich, wet soil but not in standing water
- Height: 18-24 inches
- Location of spores: Underside of fronds, on rows of dots near the midvein. Fertile fronds have leaf edges that are slightly rolled over the spore-bearing sori (see photos below).
- Stipe (leaf stalk): smooth and pale green above, black at base
- Growth pattern: random
- Persistence: deciduous
- County Distribution: throughout

Photo by: Kate Fricker, Citizens for Lexington Conservation, (pictured here with Sensitive Fern)

The twisting growth form helps distinguish this fern from Massachusetts fern. The stalk is often longer than the blade, and is black at the base.

Marsh

Photo by: Kate Fricker, Citizens for Lexington Conservation

The lowest pair and other pairs of leaflets are perpendicular to the axis.

Marsh

Photo by: Kate Fricker, Citizens for Lexington Conservation

Notice how the fertile subleaflets curl over the fruitdots.

Massachusetts Fern

Thelypteris simulata (Parathelypteris simulata)

1988 USFWS Wetland Plant Indicator Status: FACW

Massachusetts fern is a fairly common fern, yet it was not discovered until 1894. At a casual glance, it looks like a marsh fern or perhaps a New York Fern.

- Family: Thelypteridaceae
- Habitat: wooded swamps and moist, acid woods
- Height: 18-30 inches
- Location of spores: underside of fronds
- Stipe (leaf stalk): green to yellow-brown, with a few scales at the base
- Growth pattern: random
- Persistence: deciduous
- County Distribution: not Hamden

Massachusetts

Photo by: Don Lubin & University of Wisconsin- Stevens Point

Note the lowest pair of leaflets. They are “semitapered to base” as opposed to the New York fern “tapering to base.”

The Massachusetts fern does not taper as much and has a stem that is black at the base**.**

Massachusetts

Photo by: Gary Fewless

The sori are a pale brown, and are quite distinct from the sori to the similar Marsh fern and New York fern.

Ostrich Fern
Matteuccia struthiopteris (Pteretis pensylvanica)
1988 USFWS Wetland Indicator Status: FACW

- Family: Dryopteridaceae
- Habitat: moist thickets, especially along streams and rivers
- Height: 3-5 feet
- Location of spores: separate fertile frond is dense and rigid; green maturing to dark brown
- Stipe (leaf stalk): rigid; dark brown and deeply grooved at the base, green and ungrooved above
- Growth pattern: symmetric clump
- Persistence: deciduous
- County Distribution: not in Plymouth, Dukes, or Nantucket. Introduced in Barnstable.

Photo by: Eleanor Craig, Fern Ridge Farms

This fern can get up to five feet tall.

Ostrich

Photo by: Dr. John Hilty, Illinois Wildflowers

Sterile leaf of Ostrich fern, ranging in width from 14 inches at its widest point, tapering down to 1 inch+.

Ostrich

Photo by: Dr. John Hilty, Illinois Wildflowers

The fertile fronds of the Ostrich Fern can be 2 feet high. They will persist though the winter.

Marginal Woodfern
Dryopteris marginalis
1988 USFWS Wetland Indicator Status: FACU-

- Family: Dryopteridaceae
- Habitat: rich woodlands, especially on rocky slopes or outcroppings
- Height: fronds 1-2 feet long
- Location of spores: spores on undersides of leaflets along edges
- Stipe (leaf stalk): stout, ungrooved, brown-green above, darker near base, covered with dense, light-brown scales near base, more sparse above
- Growth pattern: asymmetric clump
- Persistence: evergreen
- County Distribution: Not Nantucket

Photo by: Carrie Wiles, North Creek Nurseries

The most recognizable of the wood ferns is the **marginal wood fern** (*D. marginalis*), which is also known as the leatherleaf wood fern due to the toughness of the leaves. The marginal designation is descriptive and mnemonic, as it refers to the fact that the sori are at the margins of the pinnules.

Marginal Wood

Photo by: Chris Evans, River to River CWRA, Bugwood.org

The Marginal Woodfern grows in scattered individual clumps and is evergreen.

Marginal Wood

Photo by: John Oliver, Missouri Native Plant Society

Notice how the sori (fruit dots) are on the margins of the pinnae? Hence the name, Marginal woodfern.

Bracken
Pteridium aquilinum
1988 USFWS Wetland Indicator Status: FACU

Bracken is easily recognized by its large, triangular fronds. It is a very common fern, and it often grows in large colonies. Bracken is a fire-adapted species. It has deep rhizomes that survive fires, and ashes make the soil more alkaline, a favorable condition for germination of its spores.

- Family: Dennstaedtiaceae
- Habitat: sunny or partly shaded areas with infertile soil
- Height: 3-5 feet
- Location of spores: underside of fronds, following the edge of the leaflets (see second photo)
- Stipe (leaf stalk): smooth, rigid and green; dark brown at the base
- Growth pattern: random
- Persistence: deciduous
- County Distribution: throughout

Photo by: Larry Korhnak, Florida Forest Plants

Bracken

Photo by: Virginia Kline

The leaf of the Bracken fern is divided into three almost equal leaflets or “Bracks”.

Bracken fern can often be found in dry waste areas.

This fern has been observed as tall as 5 feet.

Bracken

Photo by: Paige Filler, The Equinest

The sori can change from silvery to dark brown.

Fragile Fern (Brittle Fern)
Cystopteris fragilis
1988 USFWS Wetland Indicator Status: FACU

Fragile fern is very similar to MacKays fragile fern (*Cystopteris tenuis)*; until recently, they were considered to be varieties of the same species. Where they both occur, they can be quite difficult to distinguish. See the Flora of North America *Cystopteris fragilis* page for a discussion of the differences.

- Family: Dryopteridaceae
- Habitat: rich woodlands, esp. on exposed rocky surfaces
- Height: fronds 5-12 inches long
- Location of spores: undersides of leaflets
- Stipe (leaf stalk): Slender, smooth with a few scales near base. Dark brown/black at base becoming yellow or green above.
- Growth pattern: asymmetric clump
- Persistence: deciduous
- County Distribution: Middlesex, Essex, Norfolk, & Bristol

Photo by: Susan McDougall @ USDA-NRCS PLANTS Database

The fragile fern stalk is brittle, especially near the base.

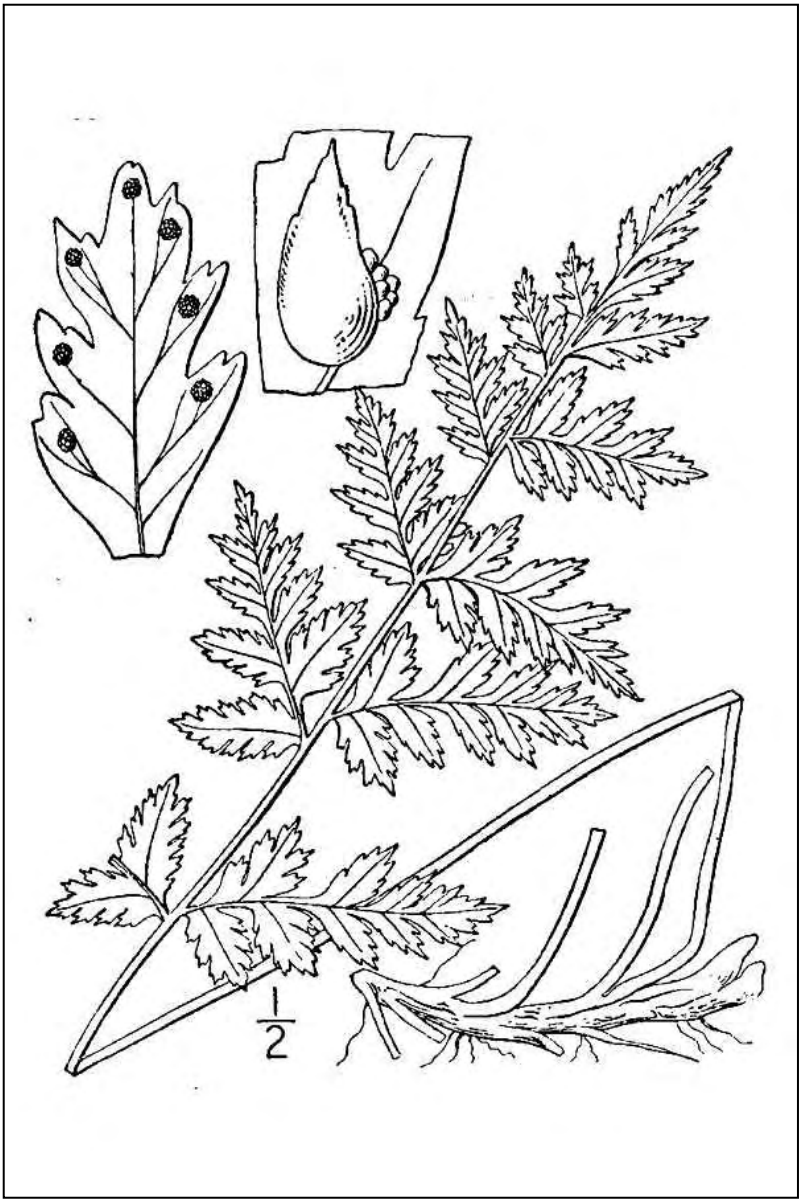
Fragile

Photo by: Arieh Tal

Fragile fern is usually found in the crevices of shaded ledges and among rocks.

It is a small fern, usually growing amongst rocks. It has a weak stem, that is dark near the base.

Fragile



Illus From: USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 15.

The fruit dots are few and scattered and tend to shrivel up early. Don't be surprised if you can't find them.

Lady Fern
Athyrium filix-femina

1988 USFWS Wetland Indicator Status: FAC

- Family: Dryopteridaceae
- Habitat: moist, partly shaded areas, usually in slightly acidic soil
- Height: 2 to 3 feet
- Location of spores: underside of frond
- Stipe (leaf stalk): green or reddish above, dark at the base; flat or grooved in front, usually with tan or brown scales
- Growth pattern: asymmetric clump
- Persistence: deciduous
- County Distribution: throughout

Photo By: Stefan Bloodworth, Lady Bird Johnson Wildflower Center

This fancy fern grows in clumps.

Lady

Photo by: Northern Shade Gardening

Some lady ferns have a telltale red stalk (forma *rubellum*).

Lady

Photo by: Gabrielle Rhodes

Photo by: Teresa Gallagher, Ekland Native Species Garden

Lady Fern sori look like eyebrows, but sometimes curved enough to look like little horseshoes. The subleaflets are cut and toothed.

Intermediate Woodfern (Evergreen Woodfern, Fancy Fern)
Dryopteris intermedia (Dryopteris spinulosa var. intermedia)
1988 USFWS Wetland Indicator Status: FACU

- Family: Dryopteridaceae
- Habitat: moist, rich woods, especially in limestone areas
- Height: fronds 2-3 feet long
- Location of spores: undersides of fronds (see third image below)
- Stipe (leaf stalk): green with tan scales
- Growth pattern: symmetric clump
- Persistence: evergreen
- County Distribution: not Nantucket

Photo by: Emmet J. Judziewicz University of Wisconsin-Stevens Point and Madison

Intermediate Wood

Photo by: Ellen Snyder

For the intermediate wood fern, take note of the second, upper pinnulet; it is longer than the first upper pinnulet next to the main stem. That is the only visible difference between intermediate and spinulose wood fern. In the latter, the second pinnulet (denoted by red arrow) is smaller than the first. You need to look at several fronds to be sure of the size comparison.

Intermediate Wood

Photo by: Ellen Snyder

Note the sori near the mid-vein, not on the margins. This is the only lacy-cut fern that is truly evergreen.

Check Ferns of Northeastern and Central North America for tips and more info on distinguishing the wood ferns.

Spinulose Woodfern (Toothed Woodfern)
Dryopteris carthusiana (Dryopteris spinulosa)
1988 USFWS Wetland Indicator Status: FAC+

- Family: Dryopteridaceae
- Habitat: moist or wet woods, swamps
- Height: 1-3 feet
- Location of spores: underside of frond
- Stipe (leaf stalk): green with light brown scales
- Growth pattern: asymmetric clump
- Persistence: deciduous
- County Distribution: throughout

Photo by: Marcie O'Connor, University of Wisconsin-Stevens Point

Spinulose Wood

Photo by: Don Crank, courtesy of Arkansas Natural Heritage Commission

Spinulose woodfern and intermediate woodfern look fairly similar. One way to distinguish them is to look at the lowest pair of leaflets (pinnae). On spinulose woodfern, the lower subleaflets (pinules) closest to the main stalk are longer than the next set further out. On intermediate woodfern, the second set out from the main stalk is usually the longest.

Spinulose Wood

Photo by: Teresa Gallagher, Ekland Native Species Garden

The Spinulose sori are round and at the end of the veins. Easy to confuse with the Evergreen woodfern.

Remember the leaf shape (see previous page) and the fact that Spinulose wood fern is not evergreen.

Maidenhair
Adiantum pedantum
1988 USFWS Wetland Indicator Status: FAC-

- Family: Adiantaceae
- Habitat: rich woodlands, often limestone soil
- Height: 12-18 inchest
- Location of spores: outer edges of leaflets (see third photo)
- Stipe (leaf stalk): thin and wiry; black or dark brown
- Growth pattern: random
- Persistence: deciduous
- County Distribution: not Barnstable, Dukes, or Nantucket

Photo by: Arieh Tal.

Maidenhair

Photo by: Kate Fricker, Citizens for Lexington Conservation

The Maidenhair fern stalk is shiny and dark, ranging from black to purple brown.

Maidenhair

Photo by: Kate Fricker, Citizens for Lexington Conservation

Underside of a frond, showing the small, round sori (spore-bearing dots) near the tips of veins.

Hayscented
Dennstaedtia punctilobula
USFWS Indicator Status: UPL (not listed)

- Family: Dennstaedtiaceae
- Habitat: dry, partially shaded woodlands and open pastures
- Height: fronds 18+ long
- Location of spores: underside of fronds
- Stipe (leaf stalk): shallow groove or none, dark green finely downy
- Growth pattern: random
- Persistence: deciduous
- County Distribution: throughout

Photo by: dogtooth77

Hayscented fern can cover large areas, often to the exclusion of everything else.

Hayscented

Photo by: Catawba County Parks – NC

Notice the shallow stem groove.

Hayscented

Photo by: Homer Edward Price

The sori are very small, situated at the edge of the pinnule.

The sori are surrounded by a cup like structure (indusium) that you may need a hand lens to see.

Additional Resources:

Arieh Tal's Quick-Guide

Ferns and Fern Allies of Wisconsin, Online Key (somewhat technical)

About the BBNEP Pocket Guide

This work was inspired by Arieh Tal's Quick-Guide (© 2002 Arieh Tal. All rights reserved, reprinted with permission) and the need for Conservation Commissioners to have a simple fern guide limited to the common ferns found in Massachusetts.

Numbering in the Quick-Guide refers to corresponding page numbers in Cobb, A Field Guide to the Ferns.

USFWS Wetland Plant Indicator Status is from "National List of Plant Species that Occur in Wetlands: Massachusetts 1988." Which is required when delineating Massachusetts wetlands pursuant to the Massachusetts Wetland Regulations , 310 CMR 10.55(2)(c).

County Distribution information is from: The Vascular Plants of Massachusetts: A County Checklist. Sorrie & Somers, 1999.

Credits:

Special thanks to Arieh Tal who developed the Quick Guide and is the major contributor of photos and text to the Pocket Guide. Arieh Tal is a nature photographer living in western Massachusetts. See his work at Nature Through the Lens - Arieh Tal - Nature Photography In addition to the "Quick Guide to the Common Ferns of New England" he has authored a "Field Guide to the Asters and Goldenrods of New England"

(links valid as of 2/27/2014)

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Page 2 (both): Catherine Taggart http://web.cortland.edu/broyles/Rock%20Fern.html
Page 3a: Dr. John Hilty, Illinois Wildflowers http://www.illinoiswildflowers.info/grasses/plants/cm_polypody.htm
Page 3b: Teresa Gallagher, http://eklundgarden.blogspot.com/2009/06/fern-inventory.html
Page 4: Stacey Scarce, Acadiana Park Nature Station http://www.naturestation.org/
Page 5: Catherine Taggart http://web.cortland.edu/broyles/Sensitive%20Fern.html
Page 6: Dr. Kenneth J. Sytsma, Botany Department, University of Wisconsin, Madison http://www.nps.gov/plants/pubs/chesapeake/plant/1307.htm
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