Aquatic Plants of Otter Lake

State Contact:

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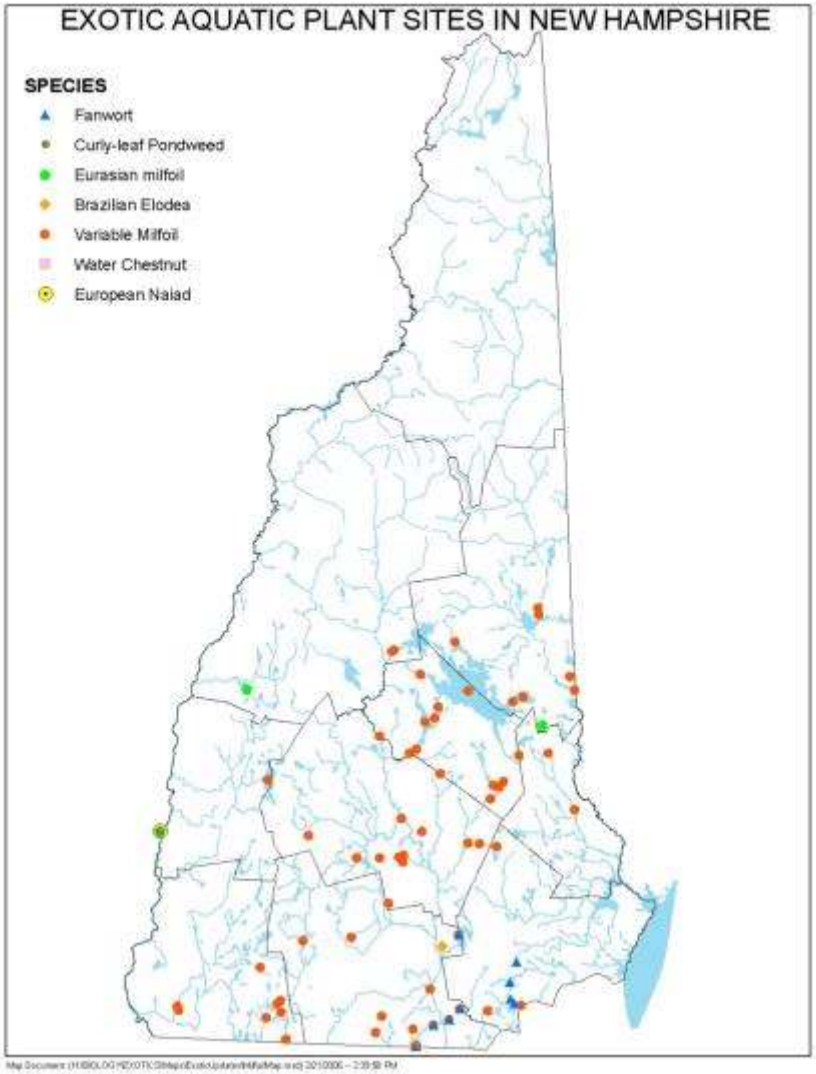
Current status of invasive aquatic plant infestations in New Hampshire



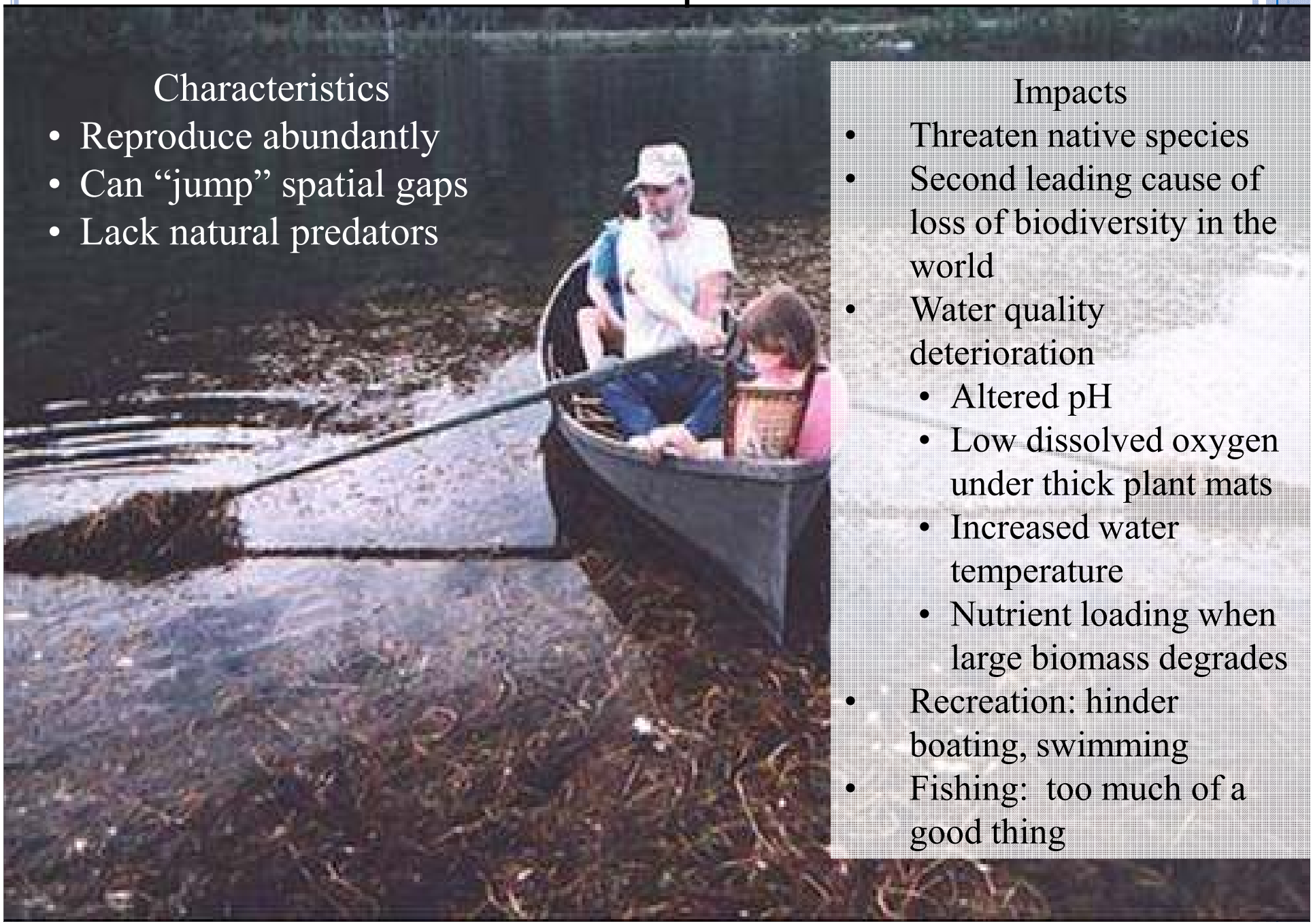
- 69 variable milfoil sites
- 5 Eurasian milfoil sites
- 9 fanwort sites
- 1 Brazilian elodea site
- 1 water chestnut site
- 4 curly-leaf pondweed sites
- 3 water naiad sites

Exotic + Nuisance = *Invasive*

Federal Executive Order 13112:

"*A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.*"

Invasive Aquatic Plants



Characteristics

- Reproduce abundantly
- Can "jump" spatial gaps
- Lack natural predators

Impacts

- Threaten native species
- Second leading cause of loss of biodiversity in the world
- Water quality deterioration
  - Altered pH
  - Low dissolved oxygen under thick plant mats
  - Increased water temperature
  - Nutrient loading when large biomass degrades
- Recreation: hinder boating, swimming
- Fishing: too much of a good thing

Facts About Infestations

- Most new infestations are found near a boat launch or other type of access point, but check anywhere, including all areas where sunlight penetrates to bottom sediments
- Motor boats are the primary vector of spread, BUT, other craft and gear can also spread invasive species
- Plant fragments, algae, and live animals (either adults or larvae) are introduced generally in small numbers from the vector and then drift or swim around the lake and reproduce and expand
- *Spread prevention is critical, and should be paired with education, outreach, and early detection activities in a two-tiered program: Prevention (Lake Hosts) and Early Detection (i.e., Weed Watchers)*

Early Detection: Volunteer Weed Watchers

Why Develop a Weed Watcher Program?

- Proactive approach
  - Volunteer Weed Watchers are the first line of defense if an exotic is introduced
- Catch infestations early
- Facilitate a Rapid Response Action
- Prevent the further spread

WHAT IS INVOLVED?

- **Volunteers are trained to monitor waterbodies for exotics, generally on-site at their own waterbody**
  - **Once a month from May to September is recommended**

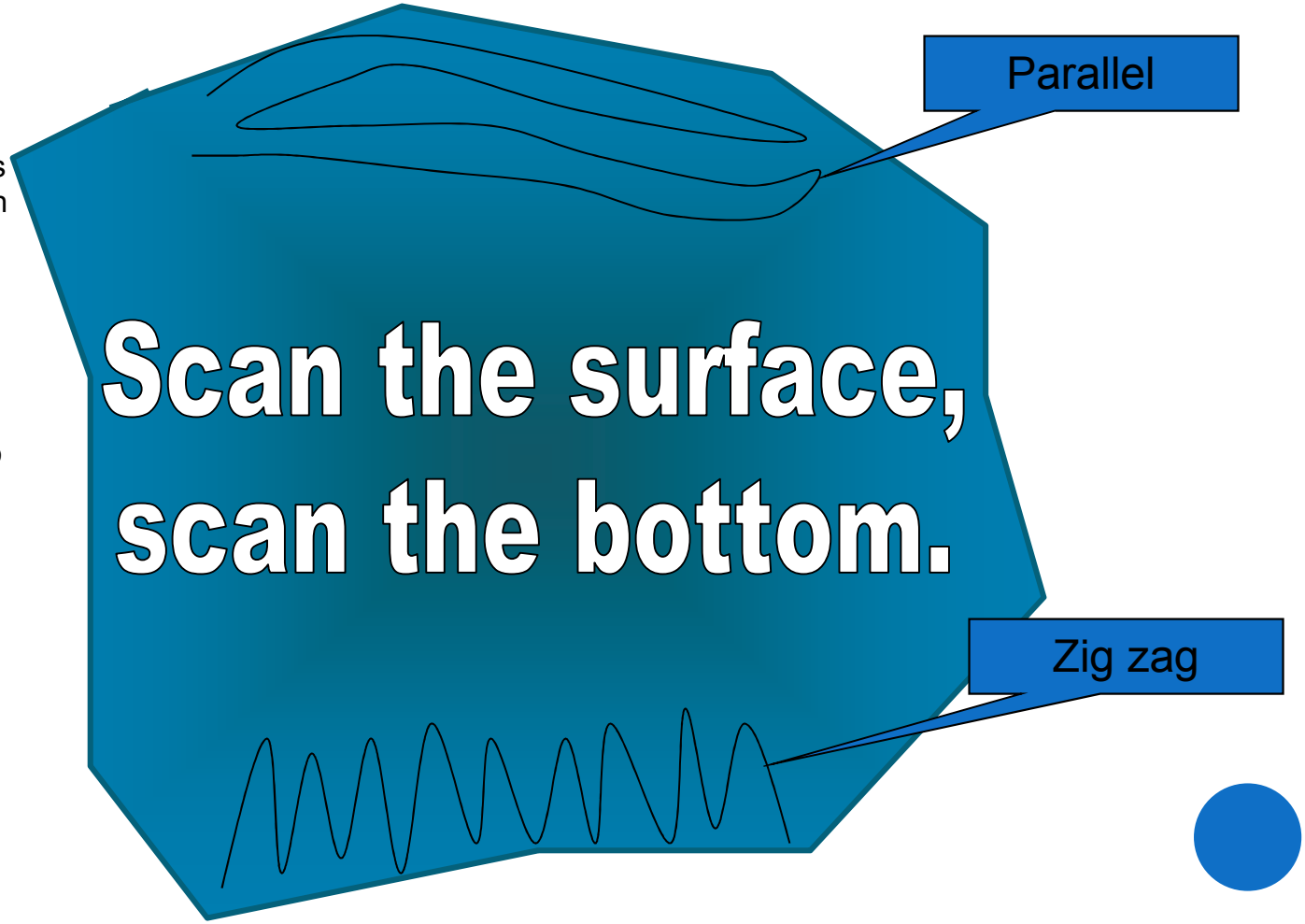
- **NHDES provides resources:**
  - **Weed Watcher Kit**
  - **Pictures**
  - **Fact sheets**
  - **Maps of the subject lake/pond (bathymetric and historical plant maps with keys)**

EQUIPMENT NEEDS ARE GENERALLY MINIMAL, AND EASY TO OBTAIN.

- ✓ Small boat with short shaft motor, canoe, kayak, or row boat
- ✓ Driver and one or more observers
- ✓ Lake outline map, pens/pencils
- ✓ Plant identification keys/pictures
- ✓ Small long-handled rake or throw rake
- ✓ Zip-lock bags
- ✓ Polarized glasses or view scope (optional)

On the Water

- Break the shoreline into sections and have volunteers sign up for each section
- From shore move in a zig-zag or parallel pattern out to deeper water to maximize how much area you cover in your survey.
- Alternate methods each month to cross over areas for thorough checking.



What You Are Looking For?

- Anything in the water that is new or out of place (was not there last month, last year, etc)
- Anything that appears to be growing quickly and taking over, appearing bigger each month
- Anything very bright green in color
- There are 29 invasive aquatic plants of concern, but the biggest threats to most waterbodies are from variable milfoil, but some regional concerns

If You Find Something

- Mark it
  - With a buoy
  - With GPS
  - Triangulation
  - Notes on site (distance off shore, water depth, landmark)

After you find something and make note of location, collect a voucher specimen

- Carefully collect a voucher specimen
  - Collect a representative piece of the plant species, being sure to collect any broken fragments that may drift away when you make the collection
  - If there are fruits or flowers be sure to collect those, and if not, then a representative piece of stem

What to do with the voucher specimen(s)

- Mailing
  - ✓ Wrap suspect species in a moist (not dripping) paper towel
  - ✓ Seal the species and moist paper towel in a Ziploc baggie
  - ✓ Put baggie and a note with your name, waterbody name, and email and/or phone number in an envelope
  - ✓ Mail to Amy Smagula at NH DES, 29 Hazen Drive, Concord, NH 03301
  - ✓ Try not to mail specimens on a Thursday or Friday
  - ✓ Keep refrigerated during holding time to NH DES for ID

What to do with the voucher specimen(s)

- Emailing a voucher specimen photo

- ✓ Lay the specimen out on a piece of white paper or paper towel
- ✓ Put a coin or pen or other known object next to the specimen
- ✓ Take a digital picture of the specimen
- ✓ Email the photo(s) to Amy.Smagula@des.nh.gov and include a note in the email about waterbody name, and your name and contact information.
- ✓ Keep the sample until you hear back from NH DES, as we may need you to mail the specimen for accurate ID if the photo is not sufficient.

Plant Refresher Morphology

Structural Plant Characteristics

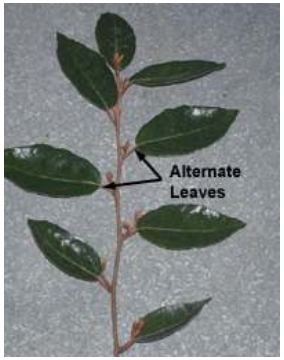
The Basics

Leaf Type

- **Forked -** These leaves divide into two prongs, resembling the shape of a fork
- **Branched** - Branched leaves have many divisions, which continue to split until the edges are composed of many tiny prongs. This type of leaf resembles the branching pattern of a tree.
- **Feathered** - Feathered leaves have several divisions off of a central stalk. These divisions do not split again. These leaves, as the name implies, look much like a feather.
- **Entire** – These leaves do not split. Each leaf is one continuous unit without lobes or serrated edges.

Leaf Arrangement

- **Alternate** - the pattern of leaf arrangement in which leaves vary back and forth on the stem, with one leaf per node.
- **Whorled** - Leaves are arranged around the stem in a circular pattern. There can be three or more leaves per node.
- **Opposite** - Leaves are arranged in pairs on either side of the stem with two leaves per node.
- **Basal** - the plant lacks an erect stem. Leaves are attached around the a very short stem located just below the soil.
- **Rosette** - Able to move freely at or just below the surface of the water. Leaves are generally arranged in clusters attached to short stems



Leaf Margin

- Smooth: A leaf edge without bumps or points
- Serrated: A margin with tiny points all along the edge much like a serrated knife.
- Lobed: The leaf edge is split into subsection as with the maple leaf.

Types of Aquatic Plants

Emergent

Submergent

Floating

Algae

Plant Refresher
NATIVE PLANTS of:
Otter Lake

Floating-leaved plants

- Includes both rooted and unrooted here

(also includes common natives that may not currently be in pond, or that were not documented during the last survey done by NH DES)

Yellow water lily

White water lily

Duckweed Family

EMERGENT PLANTS

- Plants that are rooted and have most of their biomass as erect vegetation above the water

(also includes common natives that may not currently be in pond, or that were not documented during the last survey done by NH DES)

Cattail

Bur-reed

Pickerelweed

Sweet Gale

Swamp Loosestrife
Robsplants.com

Grass Family

High-bush Blueberry

Submergent plants

- Rooted or unrooted
- Vegetative portion wholly underwater
- Flowers may be emergent

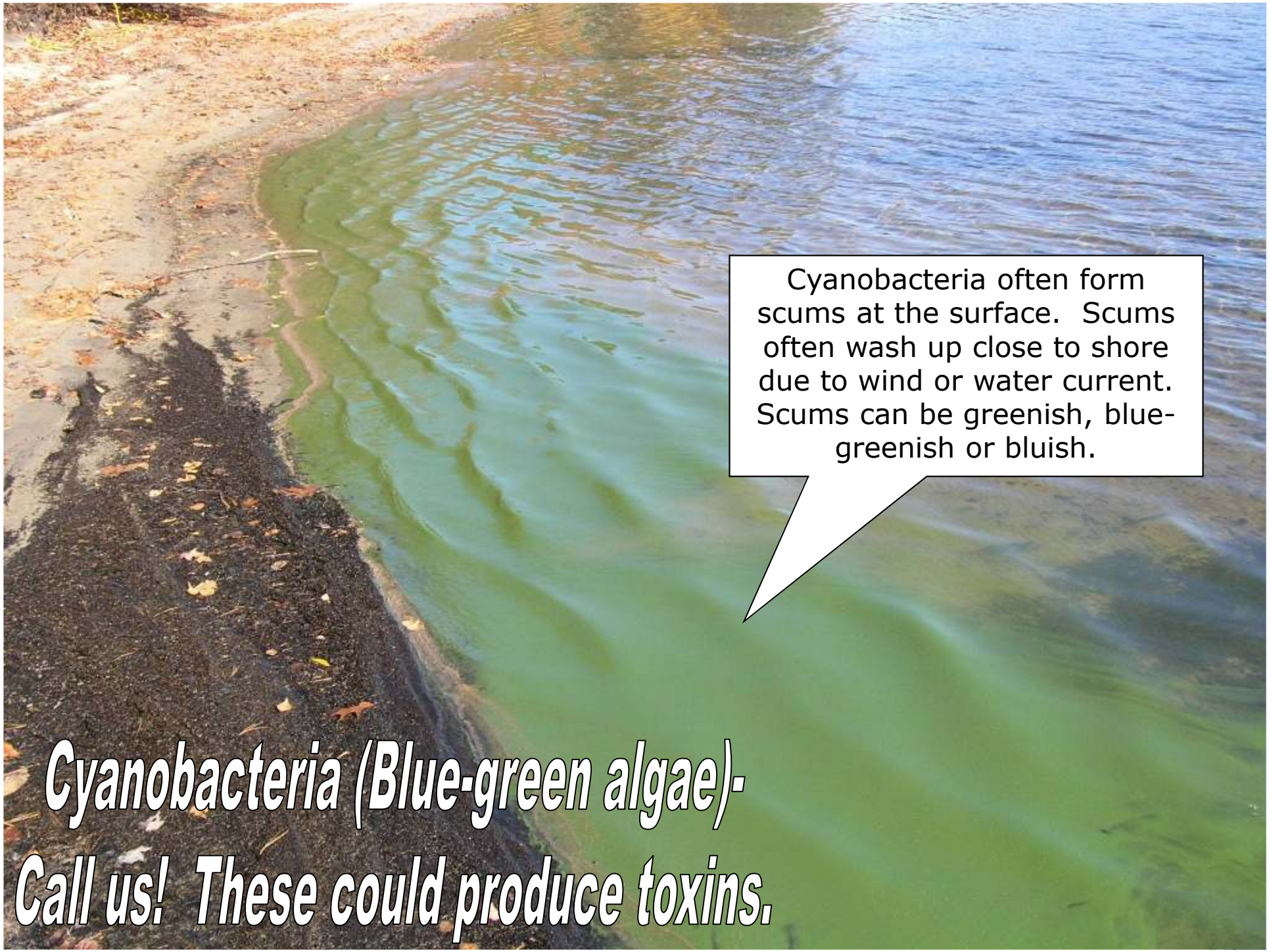
Bladderwort

Pondweed

Algae
(also important to look at)

- Single celled to colonial
- Simple plants
- Base of the food chain

Green algae= OK


Cyanobacteria often form scums at the surface. Scums often wash up close to shore due to wind or water current. Scums can be greenish, blue-greenish or bluish.
Cyanobacteria (Blue-green algae)-
Call us! These could produce toxins.

The Exotic Plants (aka- plants you <u>don't</u> want)

Use these pictures to help you identify any new growth that may come in.

Report any sightings of these to:

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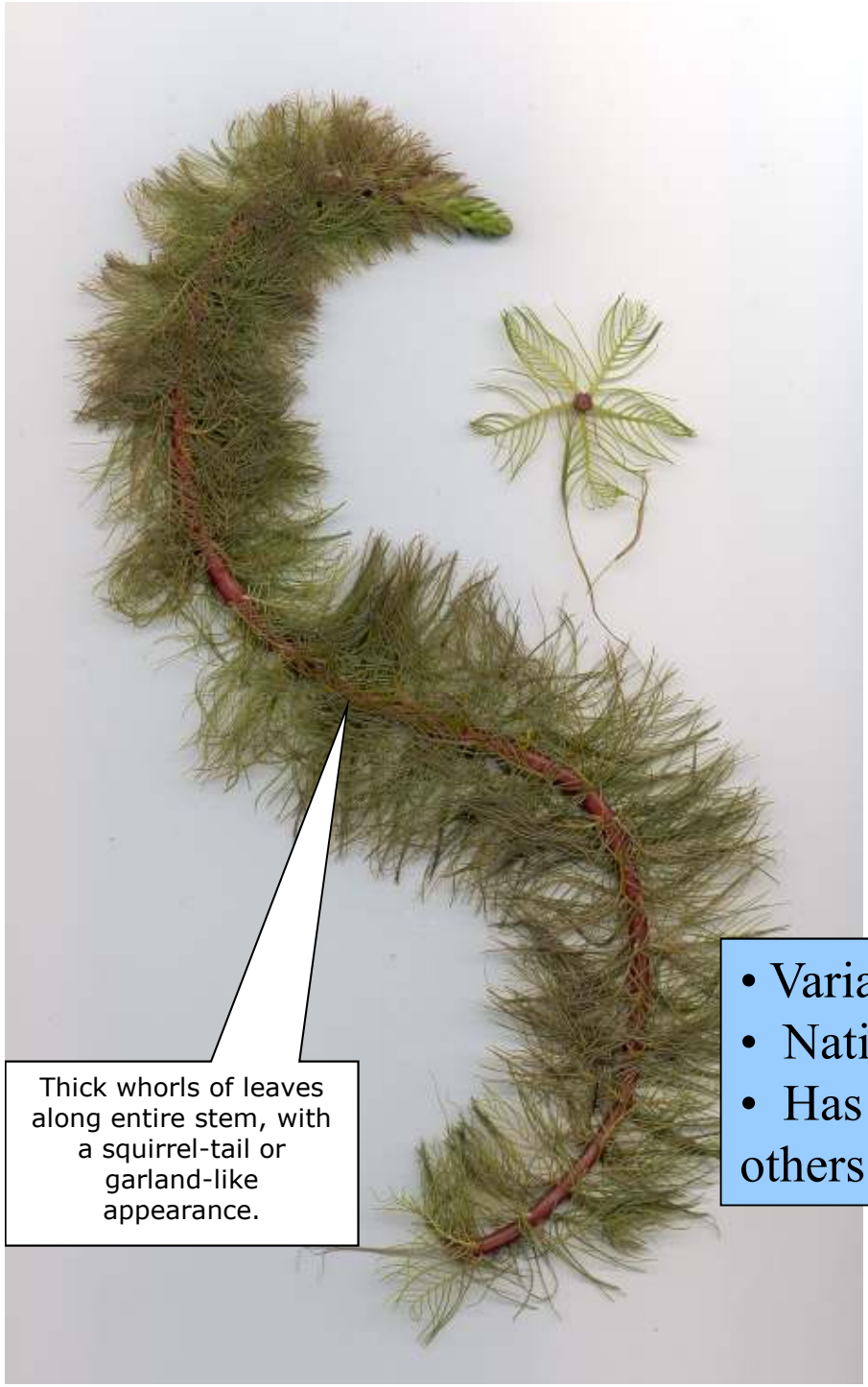
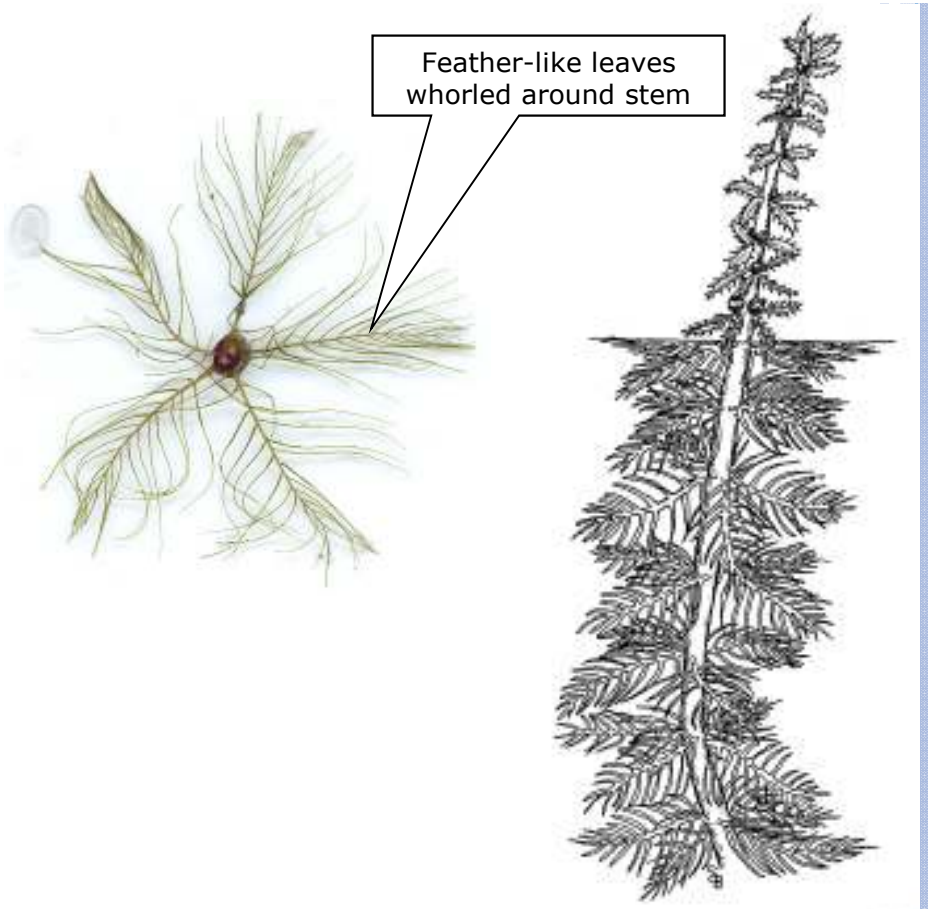
Variable milfoil (EXOTIC)

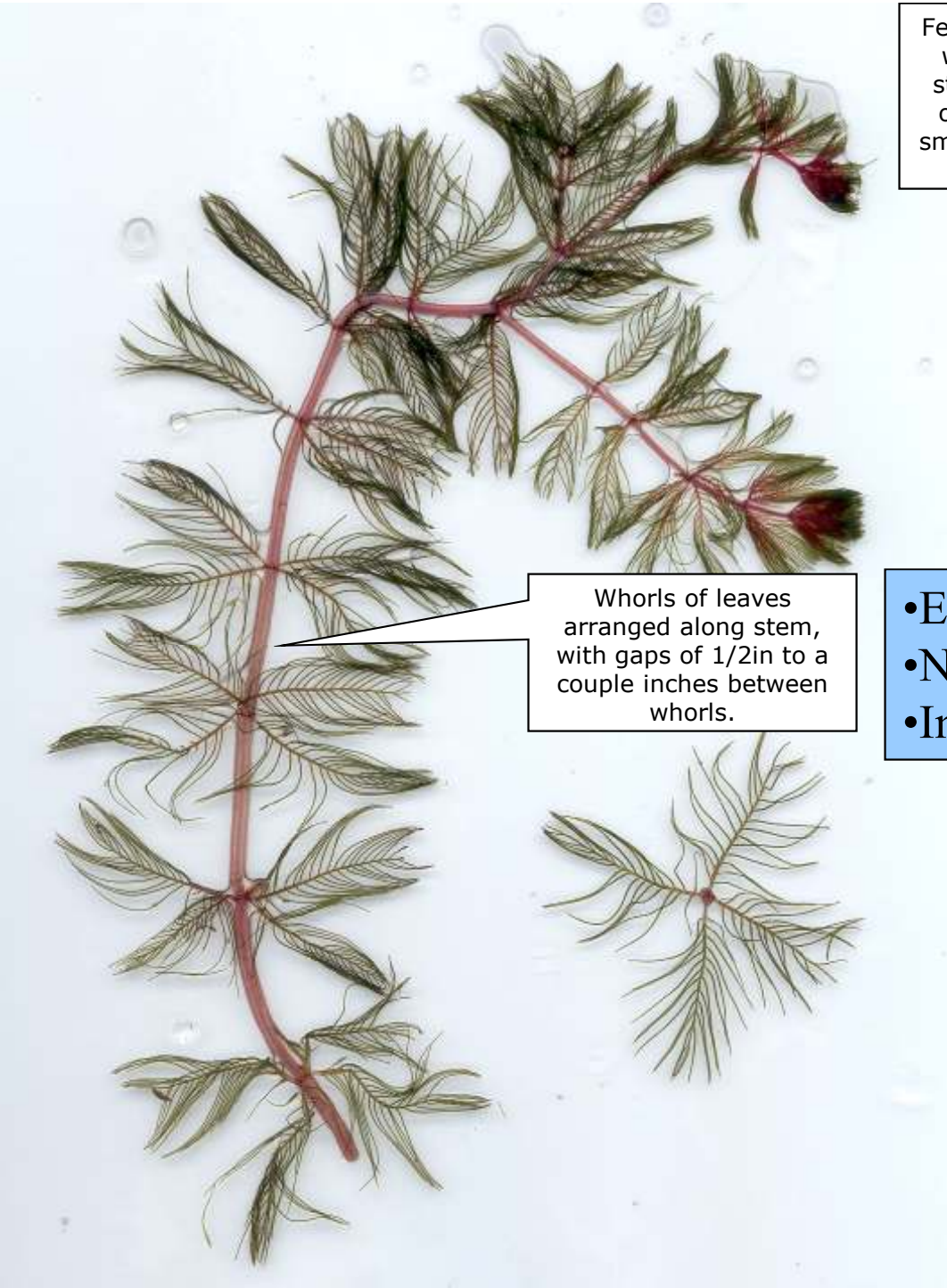




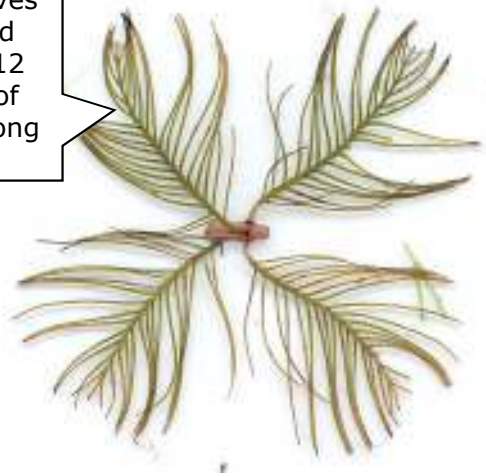
- Variable milfoil- *Myriophyllum heterophyllum*
- Native to southern and central U.S., not to NH
- Has been found in this body of water, as well as others across the state

Variable milfoil flower

Eurasian milfoil (EXOTIC)



Feather-like leaves whorled around stem, at least 12 or more pairs of small leaflets along one leaf

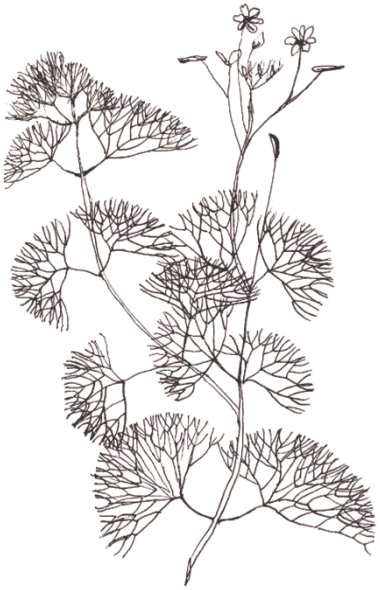


- Eurasian milfoil- *Myriophyllum spicatum*
- Native to Asia
- In 5 waterbodies in NH

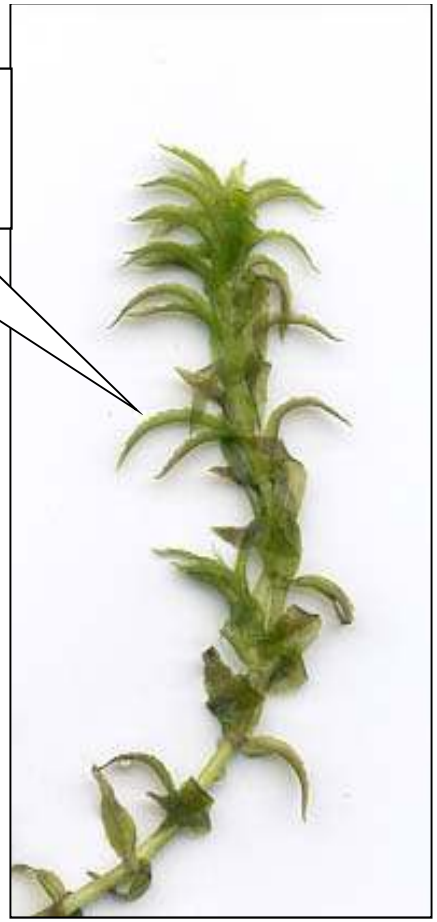
Fanwort (EXOTIC)

Branching leaves arranged oppose along stem. Note leaf is attached by a short stem to main stem of plant.

- Fanwort- *Cabomba caroliniana*
- Native to Europe/Asia
- In 9 waterbodies in NH



Hydrilla (EXOTIC)



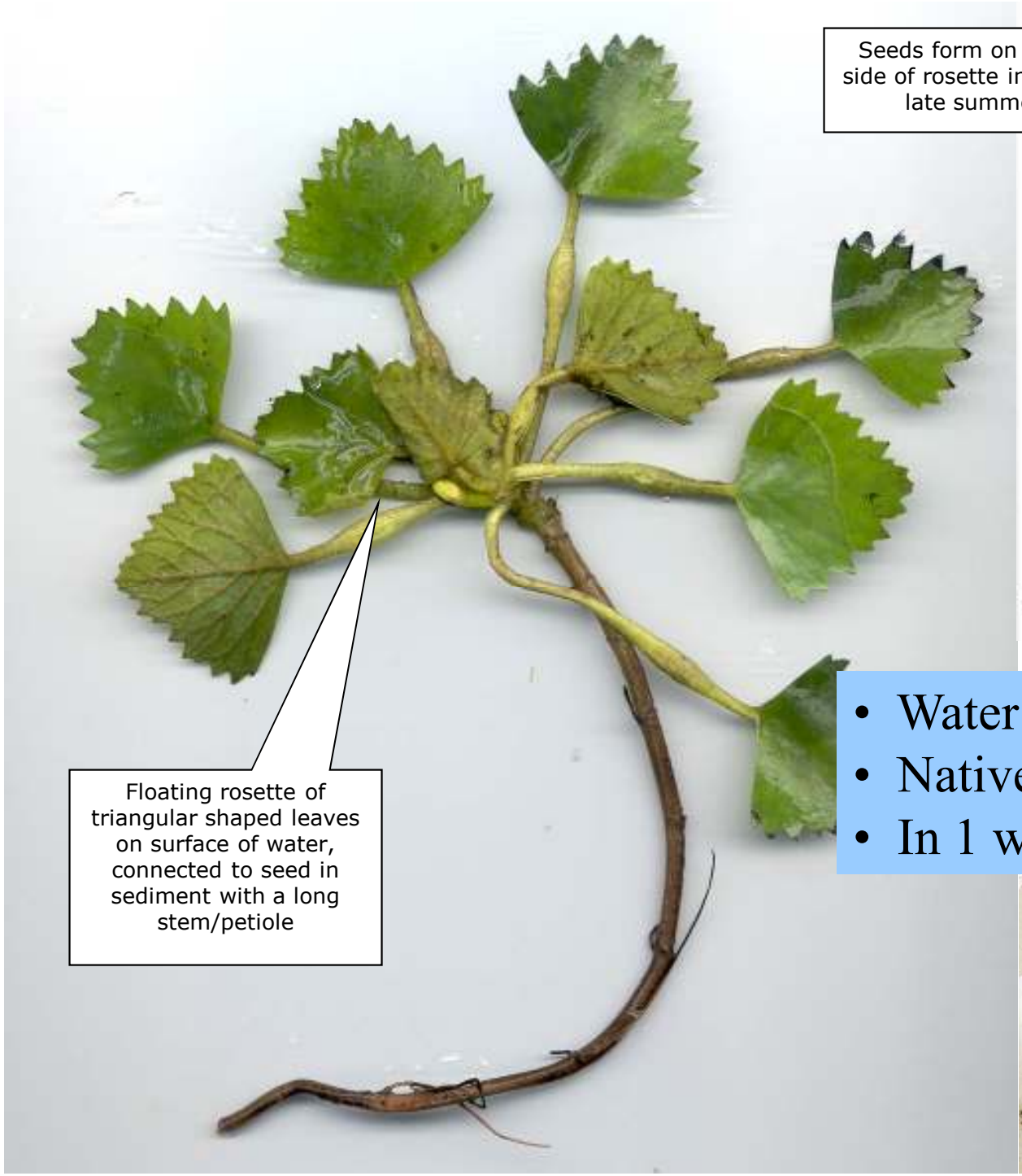
- Hydrilla- *Hydrilla verticillata*
- Native to South America
- Not yet found in NH (but found in MA and ME)

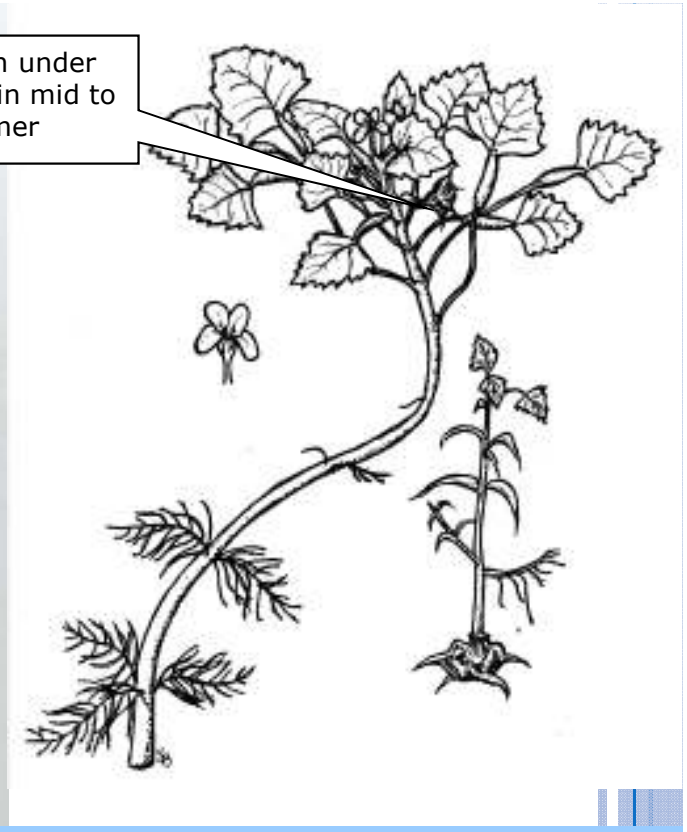
Brazilian elodea (EXOTIC)

Narrow leaves whorled around stem. Teeth present on leaf edges but need magnifying lens to see.

- Brazilian elodea- *Egeria densa*
- Native to Asia and South America
- In 1 waterbody in NH

Water chestnut- EXOTIC



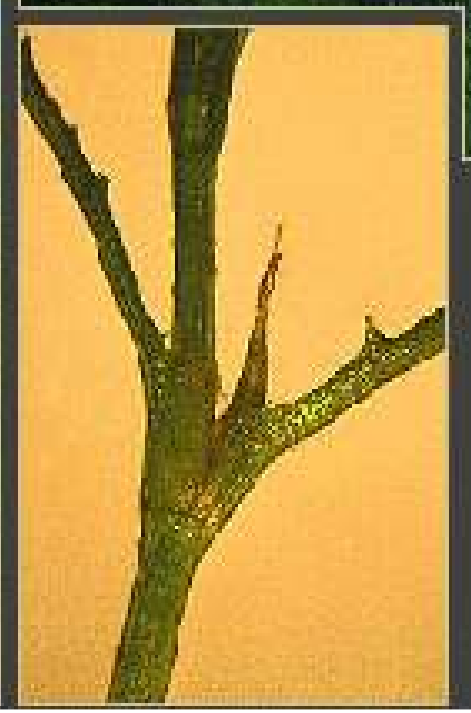


- Water chestnut- *Trapa natans*
- Native to Asia
- In 1 waterbody in NH

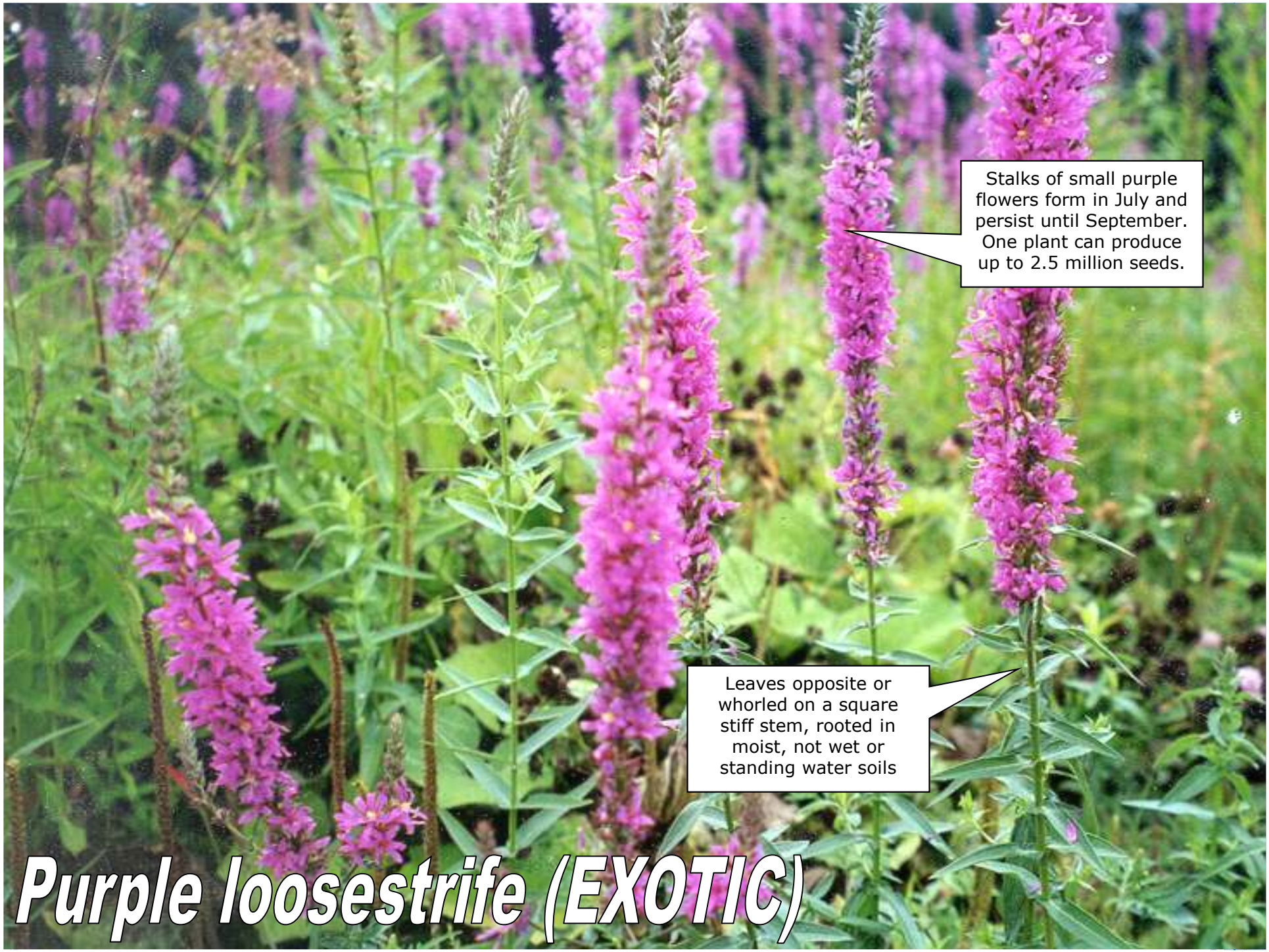
Curly-leaf Pondweed

Water Naiad

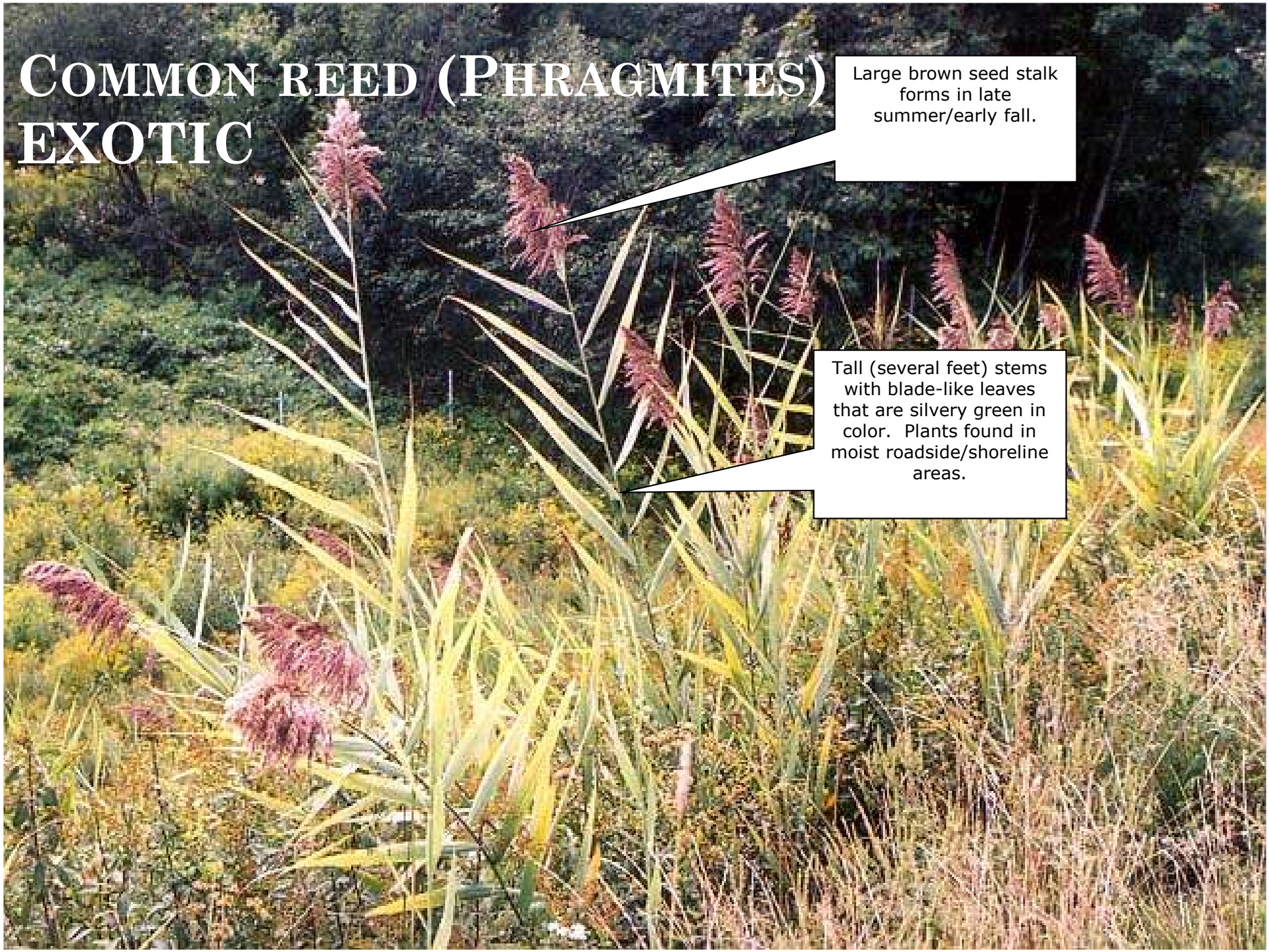
Leaves narrow with teeth on edges, very brittle and low growing plant



A. Bove, VT DEC


Stalks of small purple flowers form in July and persist until September. One plant can produce up to 2.5 million seeds.
Leaves opposite or whorled on a square stiff stem, rooted in moist, not wet or standing water soils
Purple loosestrife (EXOTIC)

Common reed (Phragmites) EXOTIC



YELLOW IRIS (EXOTIC)

Invasive Aquatic Animals (aka- critters you <u>don't</u> want)

Report any sightings of these to:

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Asian Clam

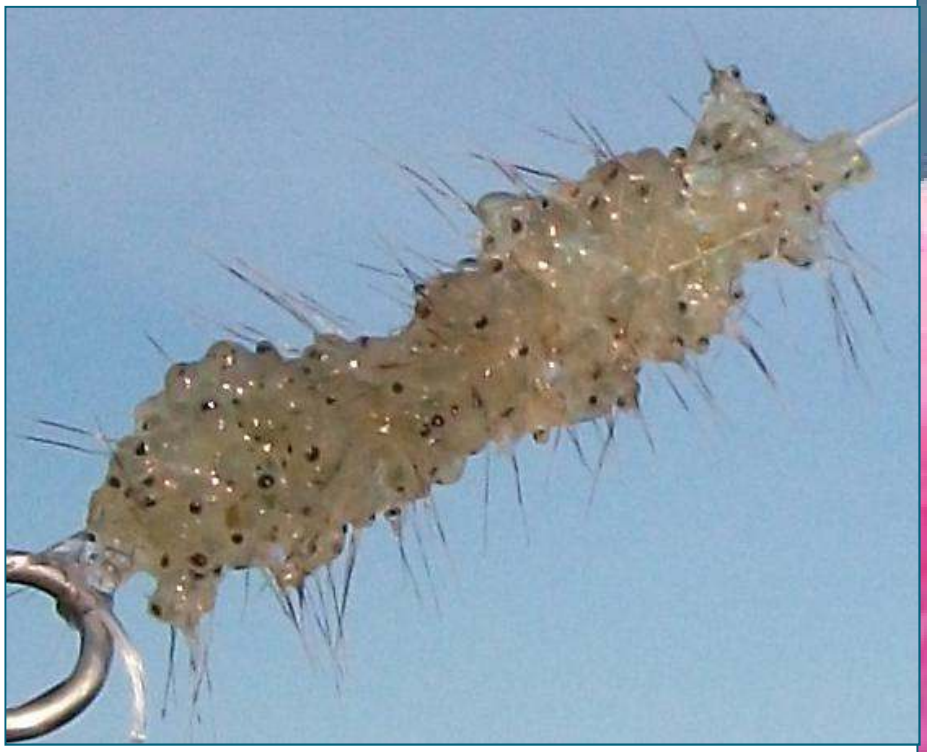
Roughly the diameter of a dime, sometimes a quarter

Chinese Mystery Snail

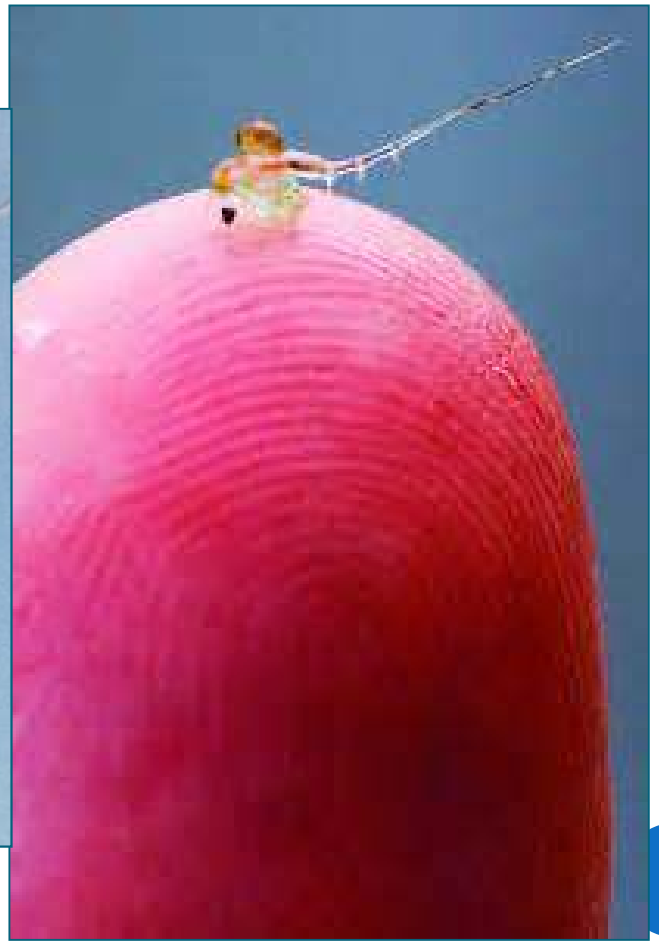
Zebra Mussel

Roughly the size of a pistachio nut

Spiny Water Flea

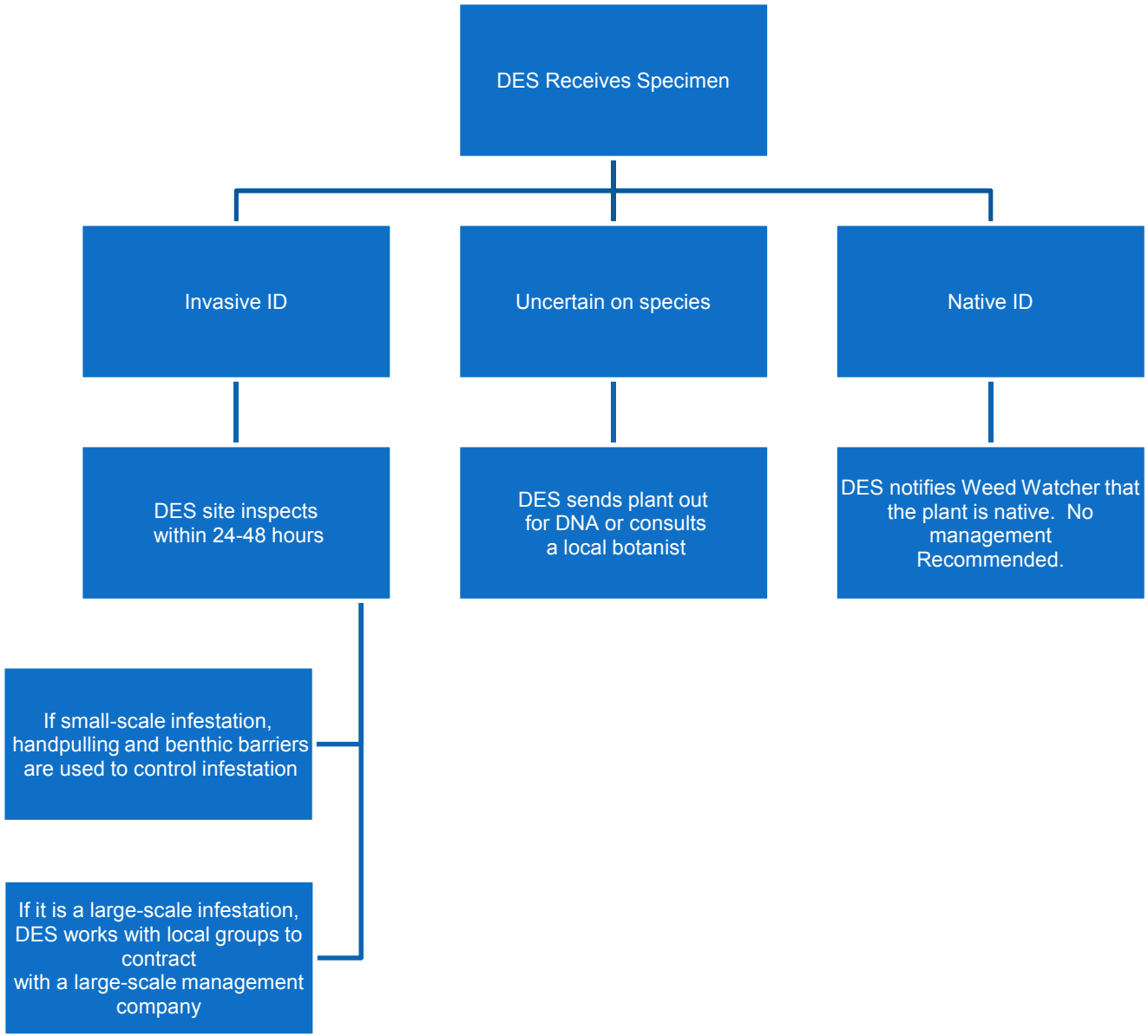


Several spiny water fleas on fishing line



Spiny water flea on fingertip

State Response



The Exotic Species Mantra

- Prevention
- Early Detection
- Rapid Response
- Control/Management

Control/Management

Plant Management

- When a new infestation is detected, reporting it immediately can increase the odds of a rapid response, quick containment, and possible eradication
- If an infestation is very large when it is found, more intensive management is needed, and the chances of eradication can be lower
- Integrated plant management techniques are varied and effective when well planned, and DES will guide management based on site-by-site conditions if an infestation is found.

Management & Control

Resources

DES Exotic Species Website

www.des.state.nh.us/wmb/exoticspecies

AQUATIC PLANTS AND ALGAE OF NH'S LAKES AND PONDS

http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-05-30.pdf