

Macroinvertebrate Monitoring

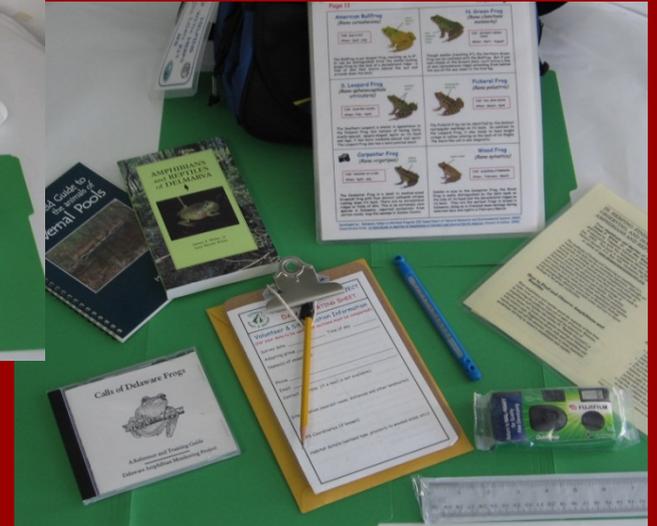


Testing the Waters



Monitoring Kit Descriptor Slides

Reptile & Amphibian Monitoring



Watching Wildlife



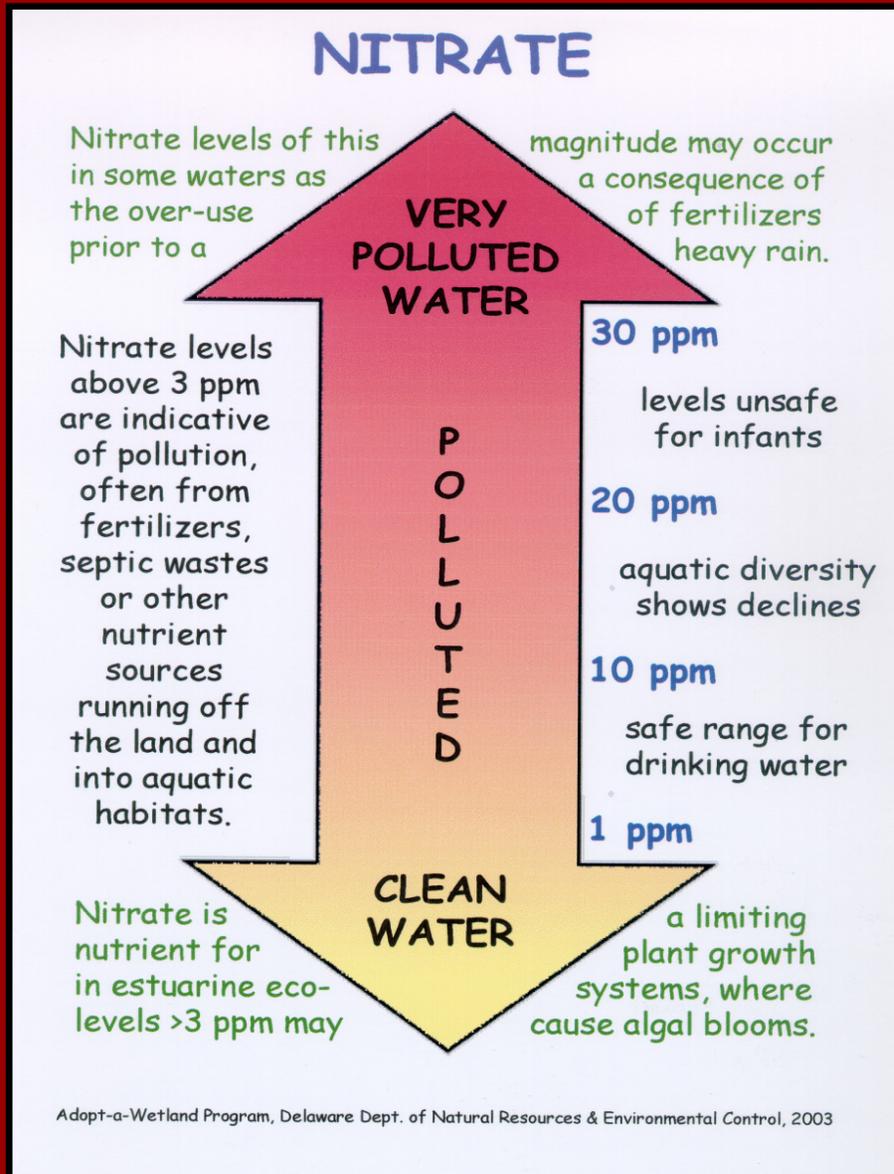
Natives/Invasives Plant Monitoring



Tracking Wildlife

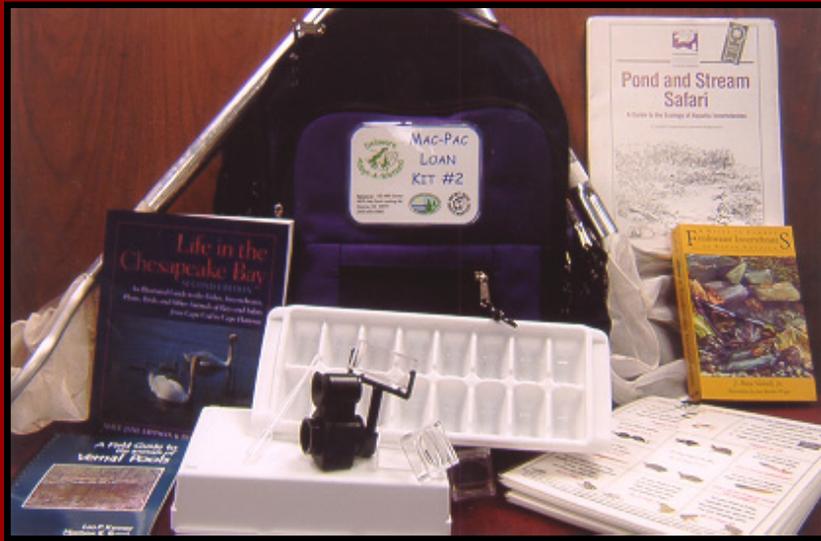


Testing the Waters kit



utilizes fast and easy-to-use test strips & kits to provide a rough assessment of key water quality conditions in the wetland

provides testing & informational materials useful for assessing: pH, salinity, dissolved oxygen, nitrates, phosphates & turbidity



this compact backpack-based kit features a variety of materials for exploring the fascinating world of aquatic invertebrate life forms; includes dip nets, sorting trays, mini-microscopes, field guides and a specially-created set of critter identification & description cards

Mac-Pac Kit

PAGE 3

WATER BEETLE ADULTS

CRAWLING WATER BEETLES

head more distinct from body

These beetles are small (<1/4" long) compared to others shown here.

They are usually brown or yellow with black spots; rows of tiny holes on wings give them a striated look

Notice also how the head on this macro extends out from it's body.

They are usually found around aquatic vegetation, often in or on clumps of filamentous algae.



WHIRLIGIG BEETLES

front legs longer than rear legs

This shiny black beetle swims fast in "schools" on the water surface. It has unique, 2-part eyes for seeing above and below the water surface.



The front legs are well-developed, but mid/hind legs are shorter and flattened like paddles for rowing.



WATER SCAVENGER BEETLES

antennae enlarged at end

These beetles are shiny-black & deeper-bodied than their more flattened diving beetles cousins.

Unlike other beetles shown, its antennae are clubbed at the end.

It's a less-smooth swimmer, with its hind legs beating alternately.

When scavenger beetles surface for air, they do so head first.



PREDACEOUS DIVING BEETLES

antennae slender

This macro can be large or small, black, brown or a mix of both.

Unlike the water scavenger, its antennae are thin throughout.

It is a smooth swimmer, stroking its hind legs in unison as it goes.

When diving beetles surface for air, they do so tail up/head down.



RIFFLE BEETLES

long antennae

As the name suggests, these small beetles prefer the swifter, rocky waters of streams & lake shores.

The hardened outer wings feature vertical rows of fine indentations giving them a pock-marked look.

The shape is more cylindrical than oval; both antennae and legs are longish for its size, with each leg ending in two prominent claws.



LONG-TOED WATER BEETLES

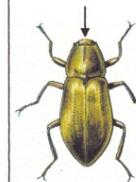
small head

Due to their small size (<1 cm), these beetles are not as often observed as others shown here.

The head is barely visible, it being withdrawn into the thorax.

Hind legs lack the hairy fringes typical of diving/scavenger types.

In magnification, the base of the antennae look like teeth in a comb.



Developed by: Delaware Adopt-a-Wetland Program (Delaware Department of Natural Resource & Environmental Control, 2003)
Illustrations from: *A Guide to Common Freshwater Invertebrates of North America* (Voshell, 2002) & *Aquatic Entomology* (McCafferty, 1981)

M-17

Calls of Delaware Frogs



A Reference and Training Guide
Delaware Amphibian Monitoring Project

Helping with Herps kit



provides an assortment of materials for familiarizing adopters with the amphibian and reptile components of Delaware's wetland fauna

Page 8

Tree Frogs and Chorus Frogs

Northern Spring Peeper (*Pseudacris c. crucifer*)



Call: Peep Peep Peep
When: late February through July

The Spring Peeper is found statewide in and around a variety of wetland habitats. They are easily identified by the X-marking on its back. The skin is smoother than the cricket frog.

Eastern Cricket Frog (*Acris c. crepitans*)



Call: two stones being struck together
When: May and June

The Cricket Frog occurs statewide on the Coastal Plain in temporary pools, ponds and slow-moving streams. It is identified by its small size (<1.5"), rough, warty skin, short hind legs, and the black triangle marking between its eyes.

Cope's Gray Treefrog (*Hyla chrysoscelis*), and Gray Treefrog (*Hyla versicolor*)



Call (Gray): slow trill
Call (Cope's): quicker higher pitch trill
When: May to July

Gray Treefrogs are larger (1.3-2") and stouter than the peeper, cricket and chorus frogs. The skin is rough and warty and usually gray to green in color. There is a white spot beneath each eye, and the back side of the hind legs is bright orange to yellow.

New Jersey Chorus Frog (*Pseudacris feriarum kalmi*)



Call: fingernails across teeth of a comb
When: Feb. to May

About the same size as Spring Peepers, the New Jersey Chorus Frog is longer-legged, smoother-skinned and has three dark stripes running down its back and side. There is also a light line on the upper lip.

Barking Treefrog (*Hyla gratiosa*)



Call: like barking dog
When: late April through July

An endangered species in DC, the Barking Treefrog is easily identified by its large size (2-2.5"), rough skin, spotted pattern, and distinctive call. Females have a white throat, and males a greenish throat.

Green Treefrog (*Hyla cinerea*)



Call: single note at 1-sec. intervals
When: May to July

The Green Treefrog is a medium-sized (1.3-2.3"), smooth-skinned, bright green species. Color and pattern variations can be considerable (see above). Often there is a whitish stripe down the side.

Developed by: Delaware Adopt-a-Wetland Program (DE Department of Natural Resource and Environmental Control, 2003)
Illustrations from: *A Field Guide to Reptiles & Amphibians of Eastern and Central North America* (Conant & Collins, 1998)

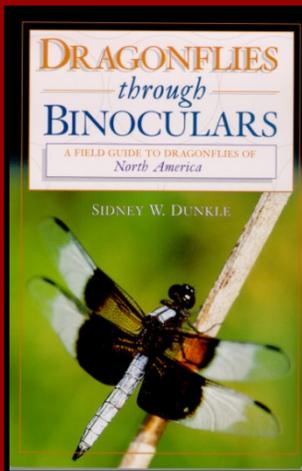
H-33

emphasizes opportunities to get involved in projects aimed at monitoring frog populations, including a frog call CD and protocol from the DE Non-Game Program

Watching Wetland Wildlife kits



This kit features selected field guides and other resources for identifying various other components of the Delaware wetland fauna, including: fishes, birds, dragonflies & butterflies.



A companion kit, rich in materials for interpreting tracks, scat, nests and other wildlife signs is also available for loan.





Wetland assessment data form for an adopted wetland site*

(please familiarize yourself with the accompanying instructions packet before beginning your study)
Site/group name _____
Observer(s) _____
Leader Email _____ Date assessed _____

What kind of wetland do you have? Use the key on page 3 of your instructions packet to ID your wetland type and check it below:
 marine tidal fringe estuarine tidal fringe riverine depositional slope flat
 other (please describe): _____

Is your wetland created or manipulated? YES NO Not Sure If YES, indicate which category applies:
 constructed (created wetland) enhancement (a non-degraded wetland modified to improve certain functions)
 rehabilitated (repair of a degraded wetland) other (e.g. stormwater basin, pond, etc.) describe: _____

Does your wetland have trees? Check the choice below that reflects the percentage of your wetland that is covered by trees:
 none or <1% 1-25% 26-50% >50%

How old are the trees in your wetland? If trees are present, determine the dominant tree type in the wetland and measure the Circumference at Breast Height (CBH) of three representative specimens, then use the formula & chart below to estimate age.

CBH (inches):	<input type="checkbox"/> Tree 1	<input type="checkbox"/> Tree 2	<input type="checkbox"/> Tree 3
Average CBH (of 3 from above)	+ 3.14 x Growth Factor = Age (check below)		
	(see chart at right)		
<input type="checkbox"/> >30 years	<input type="checkbox"/> 21-30 years	<input type="checkbox"/> 9-20 years	<input type="checkbox"/> < 3 years

Growth Factor	Species
4.0	Red Oak, Sweet Gum, Green Ash
4.5	Red Maple
5.0	Black Cherry, White Oak
6.0	American Beech
7.5	Shagbark Hickory

How is your wetland vegetated? Using the descriptors found on page 3 of your instructions, rank the following types of plants in order of greatest to least coverage within your wetland (with 1 being greatest). Leave blank the types not found in the wetland.

trees shrubs non-woody, broad-leaved emergent plants floating-leaved aquatic plants
 grasses, reeds & sedges submerged aquatic plants mosses & ferns open water (no plants visible)

Are other water bodies associated with your wetland? Check all types that apply and name the water body(ies) if known:
 ditch intermittent stream small, always-flowing stream large stream or river pond
water body name(s): _____

Where is your wetland located? Provide county and watershed name (if known), and GPS lat/long coordinates (if available):
_____ county _____ watershed _____ latitude _____ longitude
if no GPS, location by road/street/intersection: _____

How large is your wetland? If GPS is available, use it to walk the wetland perimeter and determine its area. If not, estimate wetland area by using the aerial map scale or the pacing formula provided, and check off the size range from the list to follow:
 wetland area in acres (as determined by): GPS map measurement pacing estimate (see below):

Measure the length of your pace in feet, then use that pacing distance to measure average length & width of your wetland.
length X width = area (in square feet) Compared to one acre (43,560 sq. ft.), our wetland is (check one):
 much larger somewhat larger about the same size somewhat smaller a lot smaller

* adapted by: Gary Steamer and Anthony Jackson, DE-ARE Center, from: Delaware Rapid Assessment Procedure (version 6.0) by Amy Jacobs, DE DNREC, 2010

Wetland Site Assessment

Wetland types portfolio (use with "What kind of wetland do you have?" question on page 1 of your data sheet)

Depressional wetlands are located in low areas of the landscape, where water tends to pool up from precipitation, runoff and/or groundwater. They tend to be seasonally wet (in winter/spring), and may have inlets and/or outlets or lack them completely.

Flat type wetlands are slow-draining flat areas on the landscape. They are most common in the backwaters of waterbodies or in large floodplains. The water source is usually precipitation, though some groundwater influences may also occur.

Riverine wetlands occur in floodplains and along stream corridors. Water sources are typically overbank flow from the stream channel or subsurface flow between stream and wetland. In backwaters, riverine wetlands can integrate with slope, depositional and flat.

Slope wetlands are found at the base of sloping lands where water tends to seep out of the ground and accumulate, making for wet soil conditions. Do not confuse with the sloping banks of riverine wetlands, where the stream supplies the water.

Estuarine tidal fringe wetlands occur along estuaries and rivers. They integrate inland with riverine wetlands as tidal flow enters and river flow dominates. Because tidal fringe wetlands flood frequently and are influenced by sea level, they are seldom dry.

Marine tidal fringe wetlands occur along the Atlantic Coast in Delaware. Like estuarine wetlands, marine tidal fringe wetlands frequently flood, and because water table elevations are mainly controlled by sea level, they rarely appear dry for long.

Page 4 AAW site assessment Wetland Functions & Values⁰

The following questions are designed to help you do a visual evaluation of functions and values of your wetland site. Since these questions lack specific, measurable answers – people will vary in their responses. With that in mind, work your way through the questions using what you see and know about your wetland to answer each part, then decide on a quality rating (high/medium/low) for each value area. Record this information on the summary sheet below. See pages 12-14 of your instruction manual for more details.

FEATURE EVALUATED	HIGH or YES	MEDIUM or SOMETIMES	LOW or NO
WILDLIFE HABITAT VALUE (summation of #1-6 above)			
1. Is the wetland large in size or are there other similar wetlands in the area?			
2. Are there wooded areas adjacent to or connected to the wetland?			
3. Does the wetland offer varying areas of water depth?			
4. Are there islands, hummocks, logs, or other resting areas for wildlife in the wetland?			
5. How is the plant diversity (variety of plants) in and around the wetland?			
6. Are there rare plants or animals associated with this wetland?			
FLOOD CONTROL/WATER RETENTION FUNCTION (summation of #7-10 above)			
7. Does the wetland offer an oasis of water supply for largely dry surrounding areas?			
8. Is the wetland situated so that it can soak up flood waters from a stream or river?			
9. Does the wetland offer stormwater drainage for a road, parking lot or other development?			
10. Is the wetland situated between developed upland areas and deeper water habitats?			
WATER QUALITY IMPROVEMENT FUNCTION (summation of #11-13 above)			
11. Does the wetland have a connection to a ditch, stream or other water body?			
12. Does the wetland offer stormwater drainage for a road, parking lot or other development?			
13. Is the wetland situated to provide buffering for surrounding farms, lawns or other developed lands?			
RECREATIONAL VALUE (summation of #14-17 above)			
14. Is it possible to hike conveniently to and around the wetland?			
15. Is the water in the wetland accessible and deep enough to allow use of a canoe or kayak?			
16. Is there sufficient open water in the wetland for fishing and available shoreline access to do so?			
17. Does the wetland offer other recreational opportunities? Describe: _____			
AESTHETIC VALUE (summation of #18-20 above)			
18. Does the wetland offer a refuge of natural habitat in a highly developed (urban) area?			
19. Is the wetland free of litter, trash or other such evidence of human activity?			
20. Does the wetland offer a sense of solitude, beauty or artistic inspiration?			
EDUCATIONAL VALUE (summation of #21-25 above)			
21. Is there a historic site, such as an old mill, stone bridge or historic building at or next to the wetland?			
22. Does the wetland have unique or especially interesting biological or ecological features?			
23. Is the wetland unusual for the local area because of its type, size or some other feature?			
24. Is the wetland near a school, nature center or other educational venue?			
25. Are there suitable/safe places for groups of students to gather near the wetland edge?			
Describe any other values you see in this wetland: _____			
OVERALL WETLAND FUNCTION & VALUE RATING (check box that takes into account all of the above)			

⁰ Adapted from: Miller, Ronald, Frank Mitchell and Laurs Ryder. A Study Guide to New England's Freshwater Wetlands. New Hampshire Fish & Game Department and University of New Hampshire Cooperative Extension.

A tool for assessing the condition and quality of wetland condition with respect to various human impacts and stressors is also available for download via the ARE website



www.dnrec.delaware.gov/admin/delawarewetlands

This includes a one-age visual assessment tool for evaluating key functions, values and services that your wetland provides to wildlife & people.