



ANSWERS TO aFIELD NOTES

1. Color lightly and uniformly over sample square.
2. Landforms 1 and 2
- 3-4. Examples include: delmarva - (also called a whale wallow) irregularly-shaped basin with dark water that may dry up in summer, found in coastal areas of *Delaware*, *Maryland*, and *Virginia*; a peat-accumulating wetland may be called a bog, fen, mire, moor, muskeg, or peatland depending on the locale; bottomland - usually forested floodplains along a stream or river
- 5-7. Wetlands also provide water supply, inspiration, aesthetics, recreation, nutrient cycling, flood control, atmospheric gas exchange, recharge groundwater, buffer against tidal waves, generate tourism and food production economies, timber products, fur for clothing, act as natural sewage treatment plant, outdoor classroom and produce methane, which is an energy source and helps regulate the ozone layer.
8. bald eagle
- 9-10. Cypress trees have “knees” on their roots to increase oxygen exchange and provide support like tent stakes. Chorus frogs, like other amphibians, live part of their lives in water and part on land. Eggs develop through the tadpole stage quickly before a temporary wetland dries up.
11. Many swamp plants are shaded by trees, thus wasting sunlight that could be converted into plant materials.
12. Numbers 6 and 13
13. None. Bald cypresses are one of the few needle-leaved trees that are deciduous.
14. Numbers 7 and 12
15. Numbers 2, 7, 8, 10, 11, 12, and 16
16. merganser, eider and oldsquaw
17. belted kingfisher
18. Answers will vary. Follow up the next day- Did students do what they said they would?

Wetlands and Waterfowl

PURPOSE

To inspire students to conserve wetlands and their inhabitants.

KERA ACADEMIC EXPECTATIONS

1.1, 1.2, 1.3, 1.4, 1.10, 1.11, 1.12, 1.13, 2.1, 2.2, 2.3, 2.6, 2.10, 2.14, 2.20, 2.22, 2.23, 2.24, 3.7, 4.2, 4.3, 5.2, 5.3, 5.4, 6.1, 6.3

OBJECTIVES

Students should be able to:

1. state three values of wetlands
2. compare wetlands to other ecosystems
3. create a food web containing ten wetland inhabitants
4. discuss three ways to protect wetlands.

VOCABULARY

Teachers may wish to discuss the following terms:

adaptation, endangered species, food web, hydric soils, and productivity.

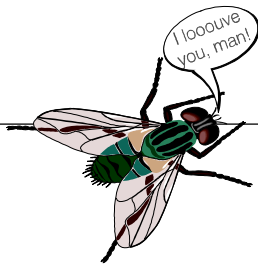
aFIELD NOTEBOOK

Ideas for Teachers

- A. Have students write recipes for other species of waterfowl.
- B. Suggest that a political group, the “dowithouts,” wishes to drain a local wetland. Students working in small groups may script and videotape a commercial on why people should vote *for* or *against* the wetland issue.
- C. Classify organisms of the “Western Kentucky Wetland” into groups like wildflowers, trees, birds and fish. Students may brainstorm other organisms in each group that would be found in a Kentucky wetland.
- D. Which wetland inhabitants would be eligible subjects for the Junior Duck Stamp Contest? Research *Quack Facts* for ducks, geese or swans.
- E. The organisms in “Beware of Wetland Predators!” are grouped according to fish, invertebrates, amphibians, mammals, reptiles and birds. Let students try to name the groups.
- F. Arrange a slog through a slough. Using the buddy system, students should suggest swamp safety tips and recommended equipment to pack. Field guide to identifying poisonous plants and animals, insect repellent, boots or old sneakers, compass, canoe, naturalist notebook, camera, and hiking staff to measure water depth are examples. John James Audubon State Park and the Sloughs Wildlife Management Area, near Henderson, are excellent field trip locations.

Western Kentucky Wetland Picture Key

1. Bald Cypress
2. Bald Eagle
3. Sweet Gum
4. Swamp Rabbit
5. Wood Duck
6. American Lotus
7. Smooth Softshell Turtle
8. Golden Shiner
9. Water Boatman
10. Grass Pickerel
11. Blue Catfish
12. Mud Snake
13. Spider Lily
14. Beaver
15. Pin Oak
16. Prothonotary Warbler
17. Red Maple



MAKE YOUR OWN FLYPAPER

Some of the best inventions are inspired by living examples. A frog's tongue is adept at catching flies. (That's why frogs make good baseball players. Ha Ha!) A frog's tongue is attached to the front of its mouth, can stretch out and is sticky. Buy some party blowouts and Velcro. Attach one small piece of Velcro to the end of the blowout. Put the opposite piece of Velcro on drawings of insects. See how fast you can catch a fly with your new frog tongue.

Less than 10 seconds = Super Herp
11-20 seconds = Toady the Terrible
21-45 seconds = Practicing Froglet
46-60 seconds = Tadpole in Waiting
Over a minute = Better Watch Out or the fly might catch you!

DEMONSTRATORS

1. Compare plant and soil samples to identify wetland areas.
2. Construct nest boxes or platforms for a specific wetland species. Install nest boxes in a local wetland.
3. Create a personal contract defining where, when and how wetlands will be protected. Sign and follow through with contract principles.

WILD THINGS FOR TEACHERS

Encourage students to enter the Kentucky Junior Duck Stamp Contest. Illustrating a junior duck stamp requires research about waterfowl, their life histories and habitat. The entry deadline is February 1. Call the KDFWR at 502/564-4336 for contest rules.

RECOMMENDED RESOURCES

- * Schaaf, Lauren and Art Boebinger, "Wetlands and Waterfowl: Kentucky must catch up," KDFWR.
- * *Wading into Wetlands*, Ranger Rick's Nature Scope Series, National Wildlife Federation, Washington, D.C., 1989.
- * "Wet and Wild Wetlands," special issue of *Ranger Rick*, April 1996.
- * "Wild Things for Kids," *Kentucky Afield-The Magazine*, Jan/ Feb 1996.

ADDITIONAL ACTIVITIES

- * Project WILD Aquatic Activities "Migration Headache" and "Wetland Metaphors"
- * Project WILD Activities "Drawing on Nature," "Museum Search for Wildlife" and "Wildlife as Seen on Coins and Stamps"

QUACK FACTS



Common Name: Redhead

Scientific Name: *Aythya americana*

Identification: easily confused with mallards and ring-necked ducks

Food: diving ducks that prefer plants

*like pondweeds, coontail and rush seeds

*also eat caddisflies, water fleas and pond snails

Reproduction: nests are concealed amidst bulrush, cattails or sedges

*average clutch size of 11 pale olive eggs

*sometimes lays eggs in nests of other birds

Calls: both quack

*males make a meow sound

*females imprint young with a kuk-kuk-kuk

Migration: in fall, through eastern Kentucky from MN to FL

*others migrate through western Kentucky from MN to LA

Status: one of the least common ducks due to low reproductive success



aFIELD NOTES



1. COLOR OF ONE HYDRIC SOIL TYPE


Sky blue + Cornflower + Gray

2. Using the keys to soil types and plant species, determine which of the three landform maps are wetlands?

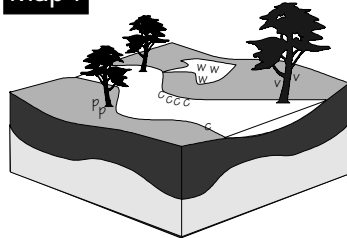
PLANT SPECIES KEY

a = arrowhead
 c = cattail
 e = evening primrose
 j = jewelweed
 l = great blue lobelia
 m = common milkweed
 n = wood nettle
 p = phlox
 s = spiderwort
 v = birdfoot violet
 w = water lily

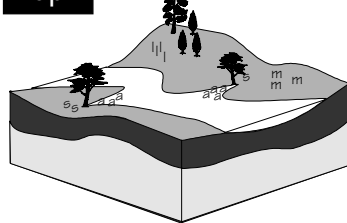
SOIL TYPES KEY

 hydric soil
 upland soil
 bedrock

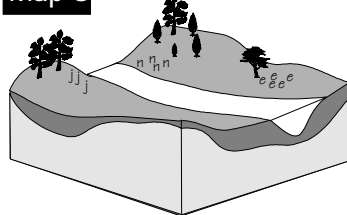
Map 1



Map 2



Map 3



Wetlands and Waterfowl

Recipe for Redheads

Ingredients:

4 tons of soil	6 truckloads of decaying plant materials (like grass clippings and fall leaves)
255,000 gallons of water	1 cup assorted seeds of pondweeds, coontail, widgeon grass and wild celery
1 cup of pond snails	2 gallons of pondwater with duckweed
2 cups of bulrush seeds	
2 cups of caddisflies	
7 cat tail seed heads	
1 cup of midges	

Directions:

Soak soil in water at least 3 weeks. Layer wet soil with decaying plant materials. Sprinkle with bulrush, cat tail and assorted seeds. Let set for 12 months. Add fresh pondwater with duckweed, pond snails and insect larvae. Bake in summer sun. Watch for redheads to rise from morning fog. Recipe is done when ducklings are sighted for years to come.

WHAT ARE WETLANDS?

Wetlands are places where soil and water meet. The land must be **saturated** for at least three consecutive weeks to produce special **hydric** soil. Wetland soils are often gray, bluish, black, or mottled with greenish-yellow color because they are low in oxygen. Mix the crayon colors in the square to the left to see a typical hydric soil.

Under wetland soil and water conditions, only certain plants live. These plants can be used as **bioindicators** of wetlands: arrowhead, water lily, cattail, bald cypress, sedge, rush, and sundew.



Arrowhead - *Sagittaria latifolia*

also called duck-potato
 * grows in shallow, sluggish water
 * leaves are often arrow-shaped
 * greenish-white flowers appear in July-August
 * runners with potato-like tubers provide food for waterfowl

Cattail - *Typha latifolia*

* grows in shallow, sluggish water
 * long leaves grow 3-6 feet tall
 * long, brown flower blooms in summer then produces "furry" off-white seeds
 * cattails provide homes and food for muskrats, people and red-winged blackbirds

Look up the meaning for two more wetland words.

3. _____

4. _____

5-7. What other benefits do wetlands supply?

8. Which federally endangered wetland bird was recently downlisted to threatened?

9-10. What adaptations do cypress trees and chorus frogs have?

BY ANY OTHER NAME, WETLANDS STILL SMELL LIKE SULFUR.

Other names for wetlands include: bog, bottomland, delmarva, fen, marsh, mire, moor, muskeg, peatland, pothole, slough, swamp, wet meadow, seep, floodplain, oxbow, swale, and lake margin. Some of these terms have slightly different meanings. For example, a marsh contains plants with green stems, while woody plants grow in a swamp.

Wetlands, under any name, have a characteristic odor similar to rotting eggs or lit matches. Decaying plant materials in the acidic water give rise to this wetland aroma.

WHY DO WE NEED WETLANDS?

Wetlands are quickly disappearing ecosystems that support one-third of the endangered species in the United States. **Endangered species** have such low populations that they may become extinct. Wetlands benefit plants, wildlife and people by cleaning **sediment** and **toxins** from water, providing food and acting as nurseries for animal young.

WETLAND ADAPTATIONS

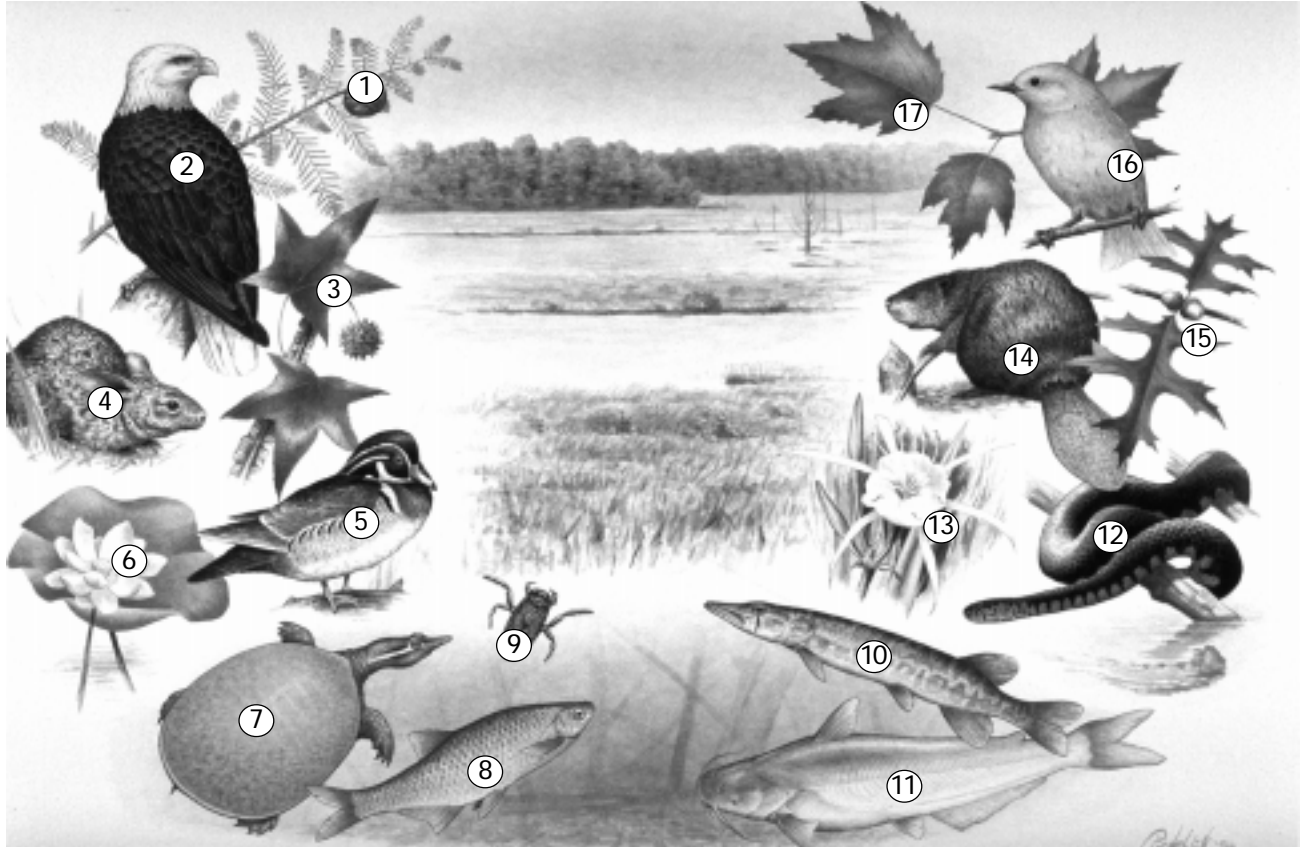
Some plants and animals are adapted to wetlands. **Adaptations** are characteristics selected over time which help organisms survive. Listed on the state's endangered species list are plants like the greater bladderwort. Lined with balloonlike bladders on its leaves and stalks, the bladderwort keeps its **photosynthetic** cells floating near the water's surface to soak up sunlight. Sensitive trigger hairs open the bladder's trapdoor so the plant can capture and digest insects, thereby gaining nutrients like nitrogen.

The pied-billed grebe, also on Kentucky's endangered species list, has lung-like air sacs throughout its body which fill to help the bird float and empty to submerge. More **hemoglobin** in grebe blood means extra oxygen. So this diving duck can stay underwater longer in search of fish food.

Kentucky's endangered species list also includes these wetland species: brown bog sedge, red turtlehead, Hall's bulrush, swamp candles, alligator gar, swamp darter, Kirtland's snake, copperbelly water snake, blue-winged teal, little blue heron and masked shrew.



Western Kentucky Wetland



11. Why do marshes use sunlight more efficiently than swamps?

12. Which plants have green, herbaceous stems?

13. Which trees are evergreen?

14. Which animals are reptiles?

15. Which animals are predators?

WHO LIVES IN WETLANDS?

An ecosystem's ability to convert sunlight into plant material is called **productivity**. Compared to deserts, lakes, forests or prairies, wetlands are among the most productive places on earth. A cattail marsh may yield up to twelve tons of plants per acre per year. Spring flooding adds oxygen and other nutrients to the wetland soils. Increased decomposition and fertility result.

More plants also mean more animals. Waterfowl, muskrats and swamp rabbits thrive on acorns, arrowhead and pondweeds. Snapping turtles and peregrine falcons prey on ducklings, while cottonmouths enjoy rabbit dinners. Insects quickly multiply in wetlands. Water boatman collect tiny algae particles for food. In turn, boatman are eaten by young fish. Male mosquitoes drink cattail juices. Female mosquitoes need nutritious blood to lay eggs. Frogs, dragonflies and prothonotary warblers enjoy mosquito munchies. The diversity of plant and animal life produces a complex food web. A **food web** shows how several food chains are interconnected.

People also obtain food from wetlands. Rice, water chestnuts, blueberries, cranberries and persimmons grow in wetlands. Crayfish and frog legs are favorite Cajun cuisine. Those with a gourmet taste enjoy barbequed beaver, muskrat casserole, turtle soup and duck a la orange.

BEWARE OF WETLAND PREDATORS!

- american EEL
- black CRAPPIE
- BOWFIN
- largemouth BASS
- longnose GAR
- rainbow TROUT
- SAUGER
- WARMOUTH

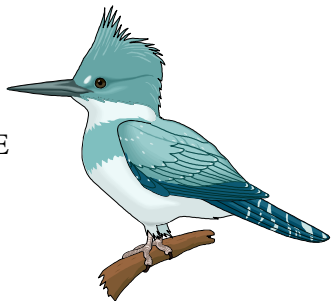
- brown waterSCORPION
- dragonFLY
- eastern TOEBITER
- giant WATER BUG
- six-spotted fisher SPIDER
- large diving BEETLE

- eastern NEWT
- mudPUPPY

- black BEAR
- MINK
- RACCOON
- red FOX
- RIVER OTTER

- COTTONMOUTH
- MUDTURTLE
- smooth softSHELL turtle
- WATER SNAKE

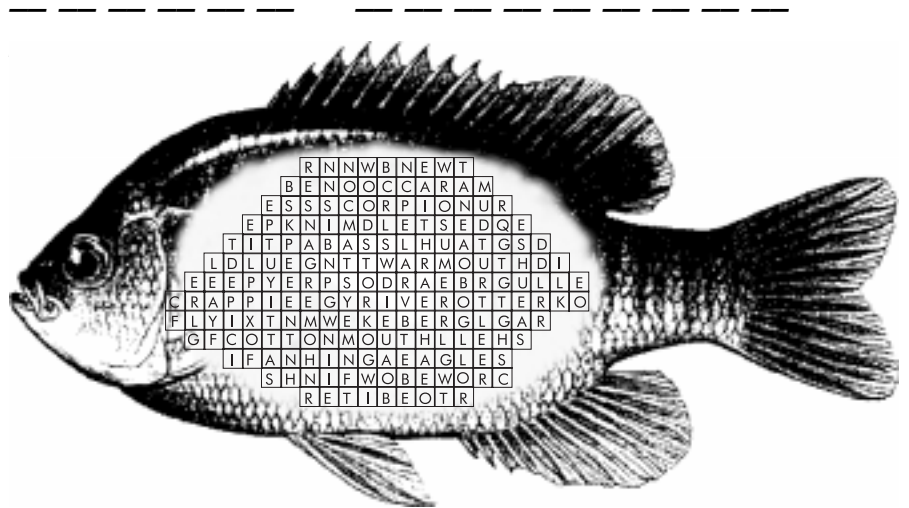
- ANHINGA
- bald EAGLE
- common LOON
- fish CROW
- great blue HERON
- herring GULL
- hooded MERGANSER
- king EIDER
- least TERN
- OLDSQUAW
- OSPREY
- pie-billed GREBE
- snowy EGRET
- SNOWY OWL
- WOOD STORK



16. Which predators could be drawn for the Junior Duck Stamp Contest?

To avoid being someone's tasty meal, this fish has all senses on alert. Can you help it spot the predators waiting in ambush? Shade in the CAPITALIZED part of their names. They can be found vertically, horizontally, diagonally and backwards in the puzzle. The remaining unshaded squares will spell out the name of the mystery animal.

17. The mystery predator is the



BECOME PART OF THE SOLUTION

About 80 percent of Kentucky's wetlands have been destroyed. Although wetlands exist in each of the commonwealth's 120 counties, only 360,000 acres remain. Additionally, one acre of wetlands somewhere in the United States is destroyed every minute. Rather than compounding the problem, perhaps you can help protect our precious wetland resource. Take action!

- A. Learn more about wetlands and their inhabitants.
- B. Be inspired like many famous writers, artists and poets. Design slogans, music, and other art forms to get a wetland message to others. Enter the junior duck stamp contest!
- C. Be a good environmental citizen. Get the facts, sign petitions, write letters to legislators and vote on issues.
- D. Practice conservation at home. Dispose of wastes like motor oil properly. Conserve water, electricity and recycle.
- E. Restore wetlands by planting seeds, providing feeding stations and building nesting structures.
- F. Become a wetland owner. You already own a portion of more than 500 National Wildlife Refuges and 67 state-owned lands. Adopt an acre or more.
- G. Join a conservation organization like Ducks Unlimited.
- H. Prevent soil erosion, limit the use of pesticides and pick up litter.
- I. Be a role model for others.
- J. Most of all, **enjoy the wetlands we have.** Wetlands are great places to fish, hunt, hike, watch wildlife, canoe, take photographs and relax.

18. What could you do today to help protect wetlands?