RESTORING MASSACHUSETTS WETLANDS

Please feel free to make as many copies as you wish and let us know how you're using the coloring book.

RESTORING MASSACHUSETTS WETLANDS

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Laury Zicari

Prepared for the Massachusetts Wetlands Restoration and Banking Program under a grant from The Massachusetts Bays Program

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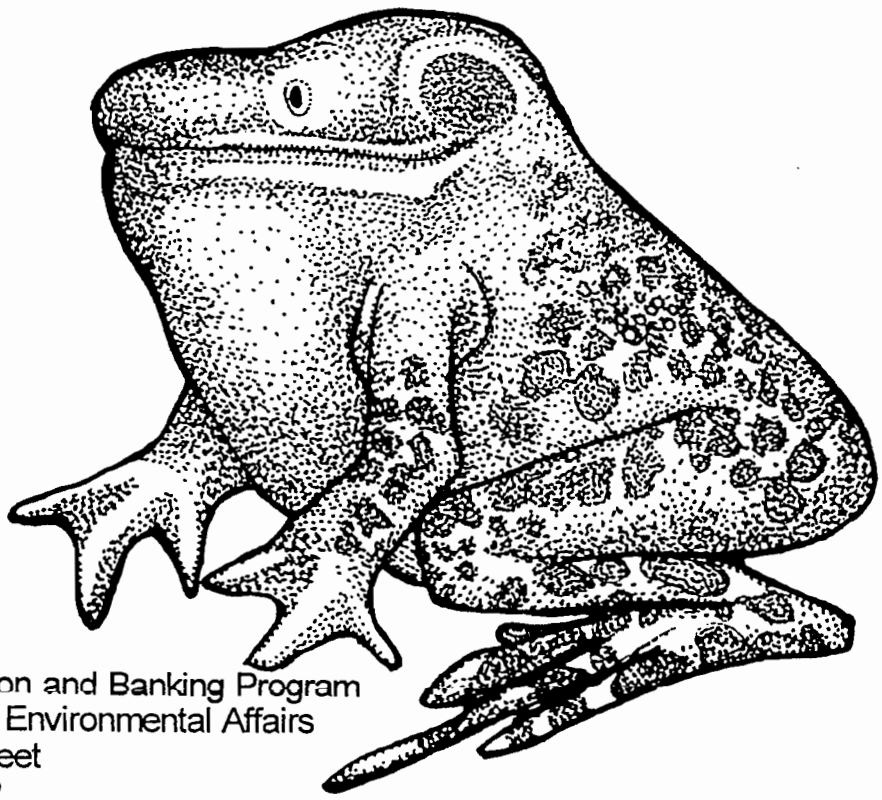

Wetlands Restoration and Banking Program
Executive Office of Environmental Affairs
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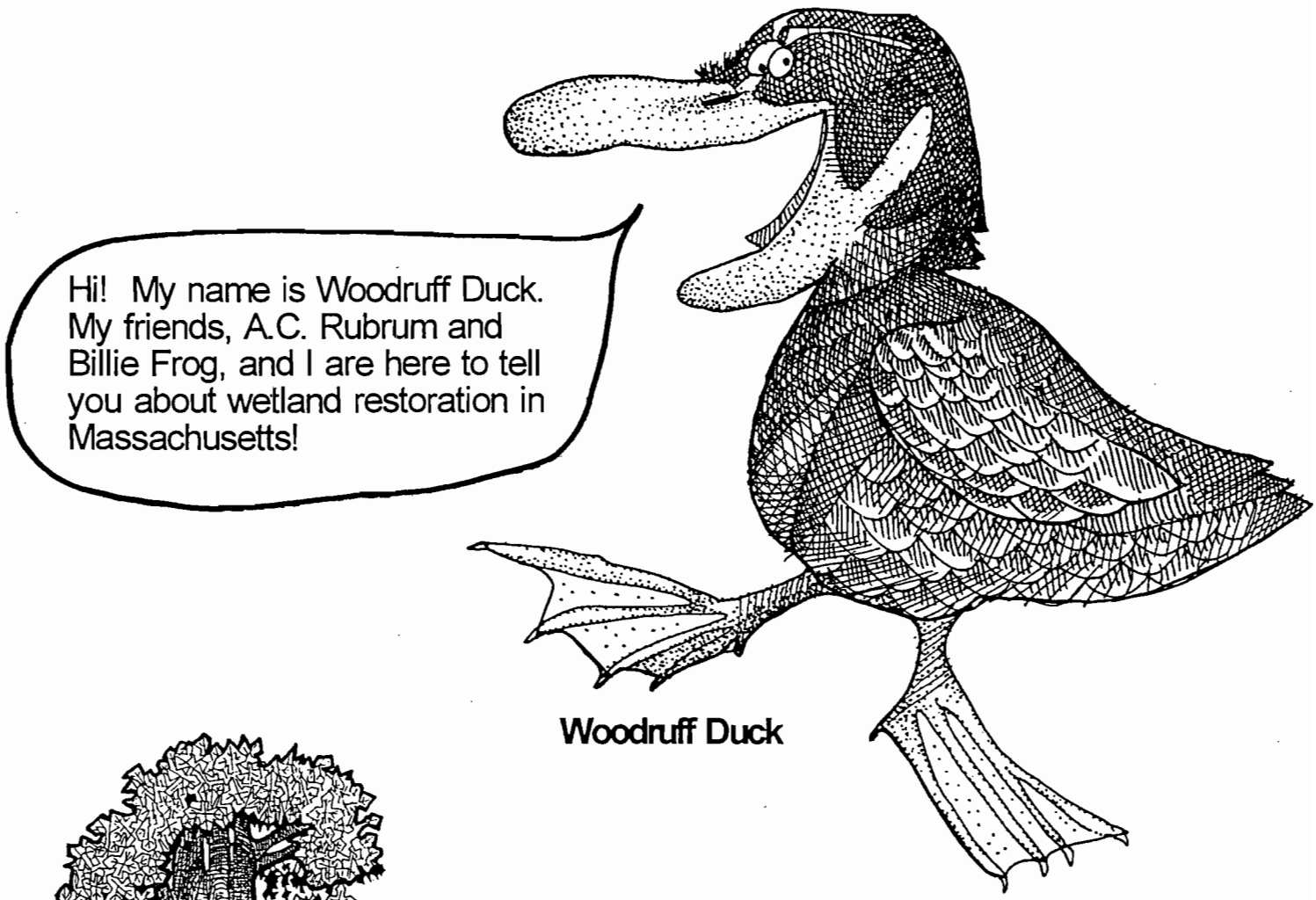
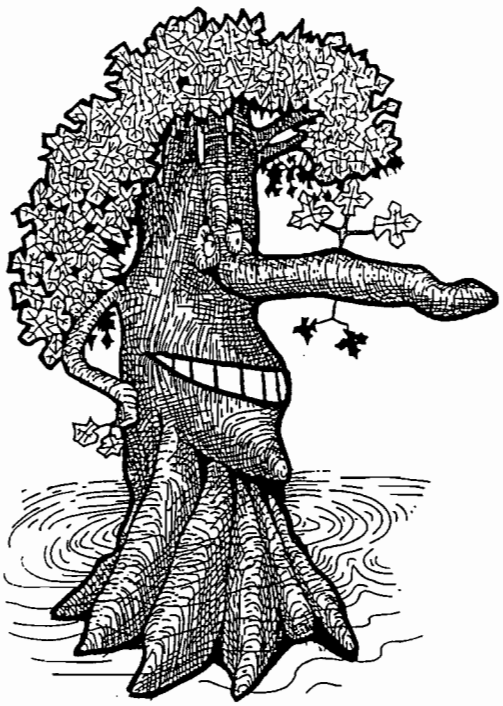
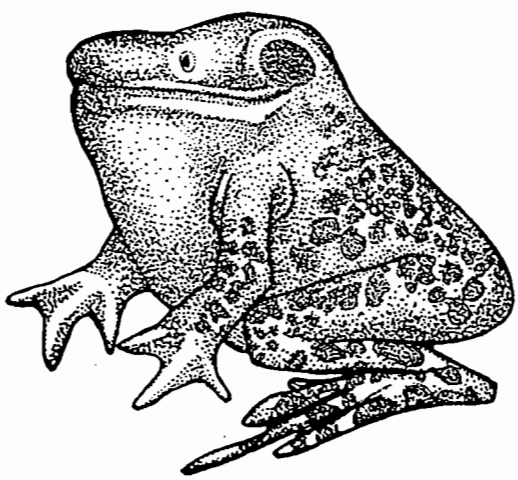


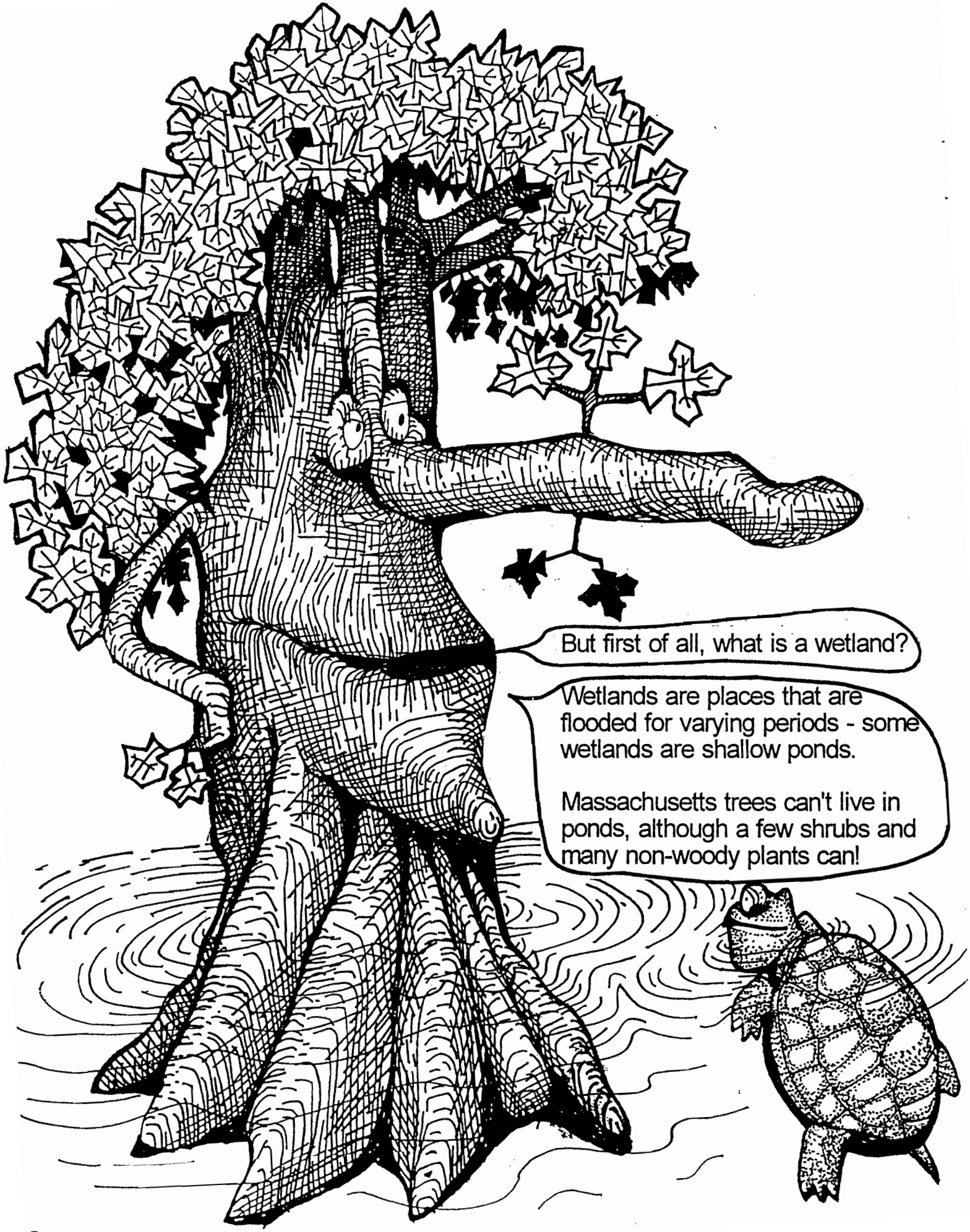
Woodruff Duck



A.C."Red" Rubrum



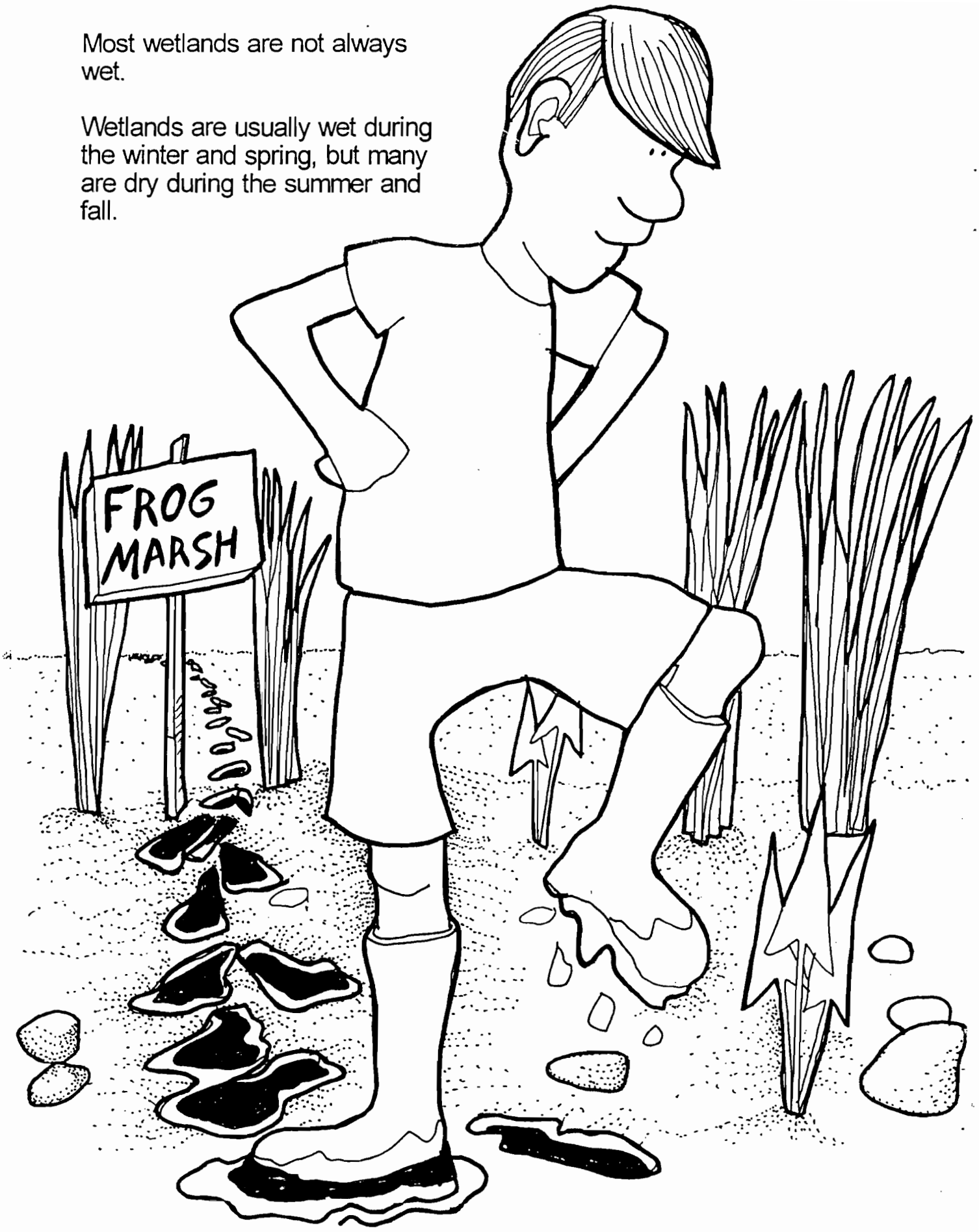
Billie Frog

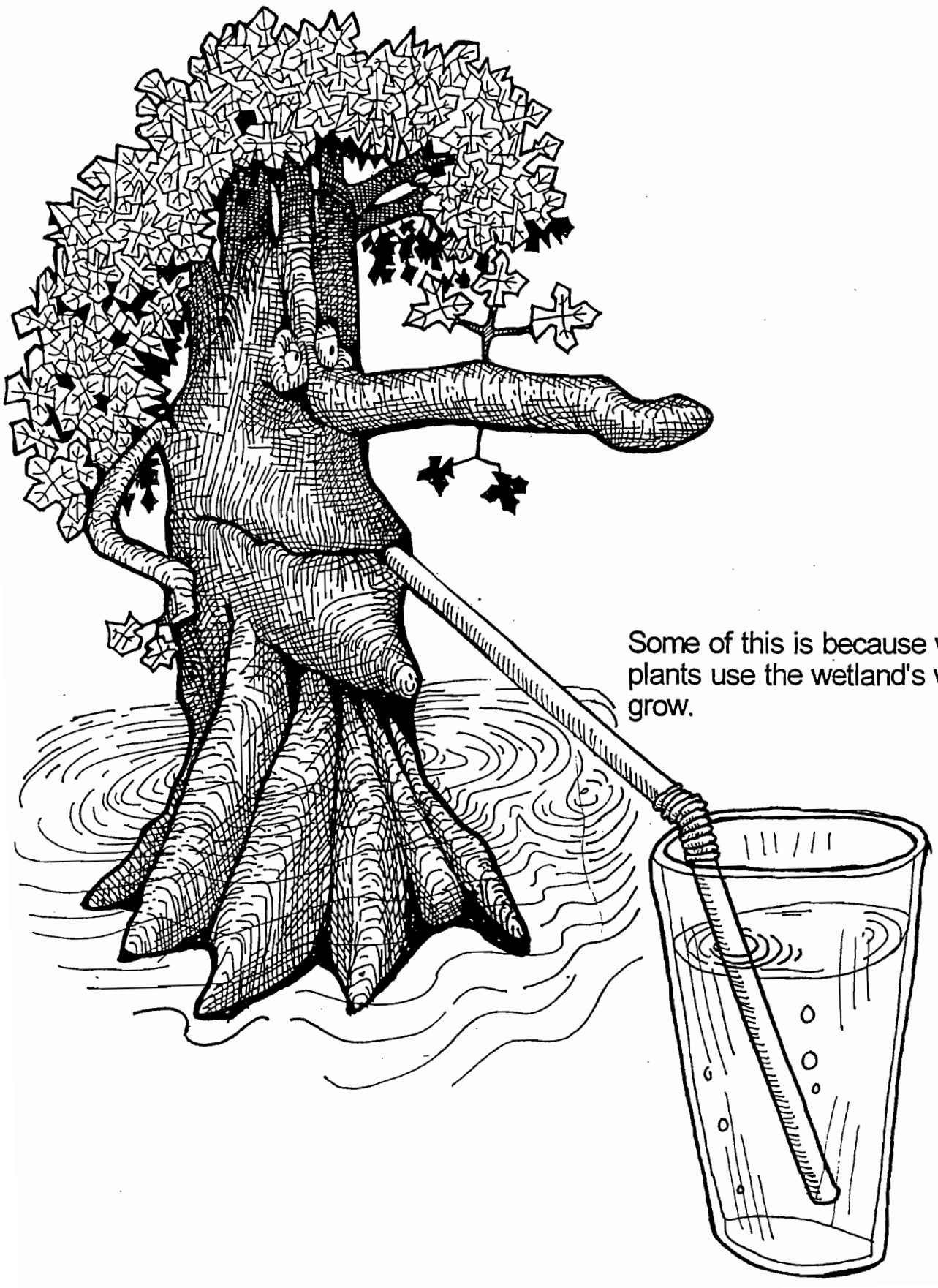

But first of all, what is a wetland?
Wetlands are places that are flooded for varying periods - some wetlands are shallow ponds.
Massachusetts trees can't live in ponds, although a few shrubs and many non-woody plants can!


FROG
MARSH
Other wetlands are places that have soggy soils for a few weeks or so during most years.

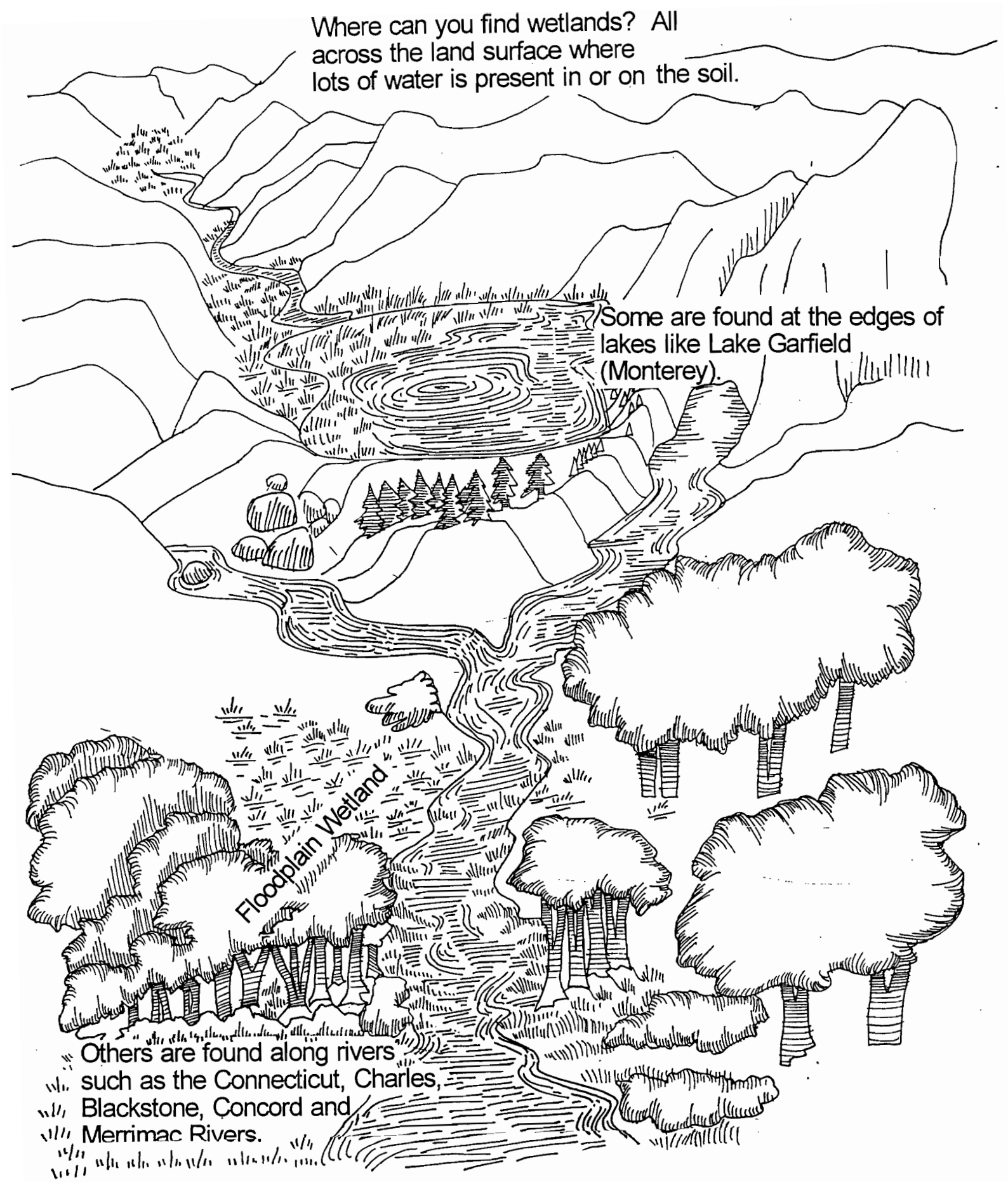
Most wetlands are not always wet.

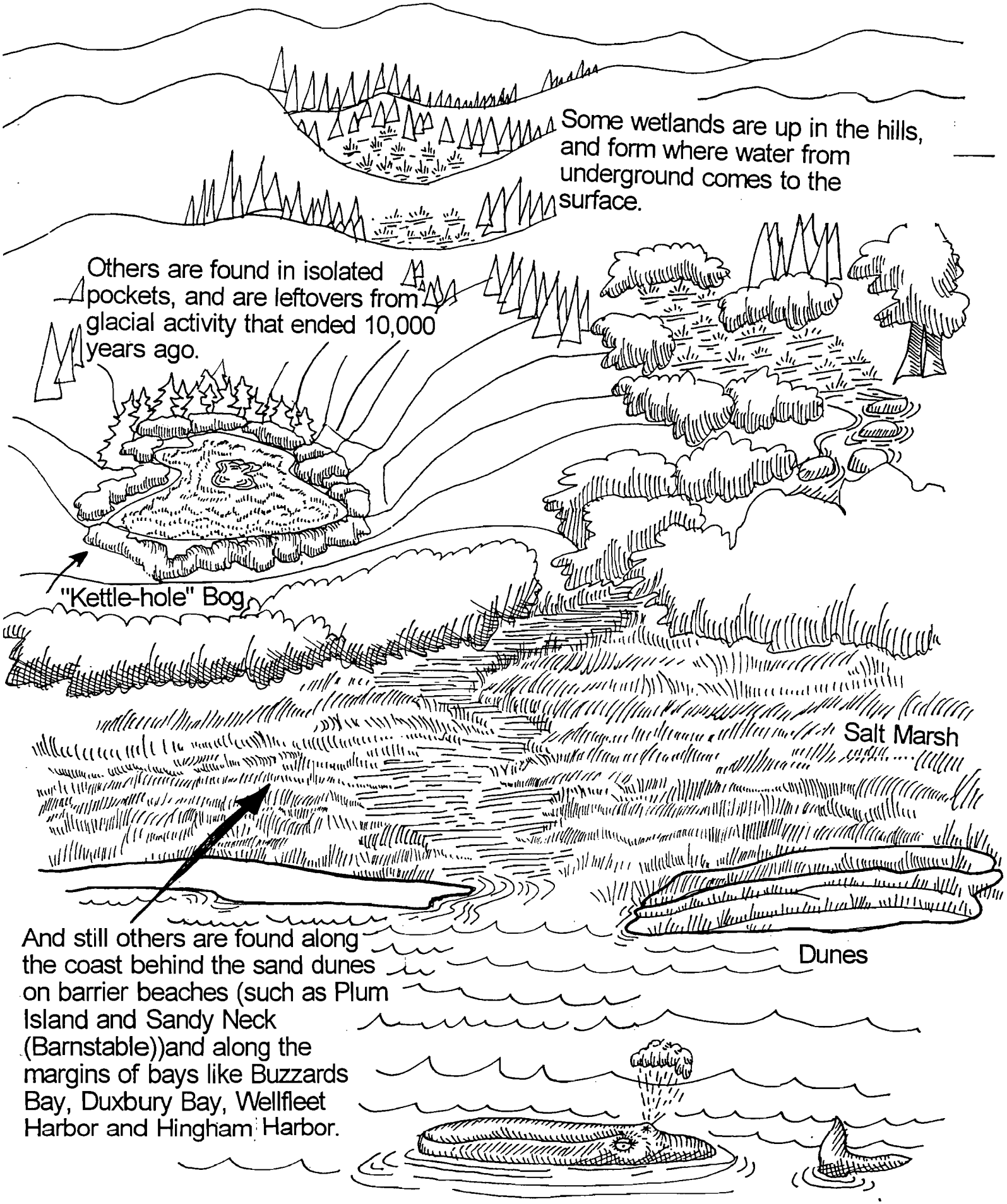
Wetlands are usually wet during the winter and spring, but many are dry during the summer and fall.

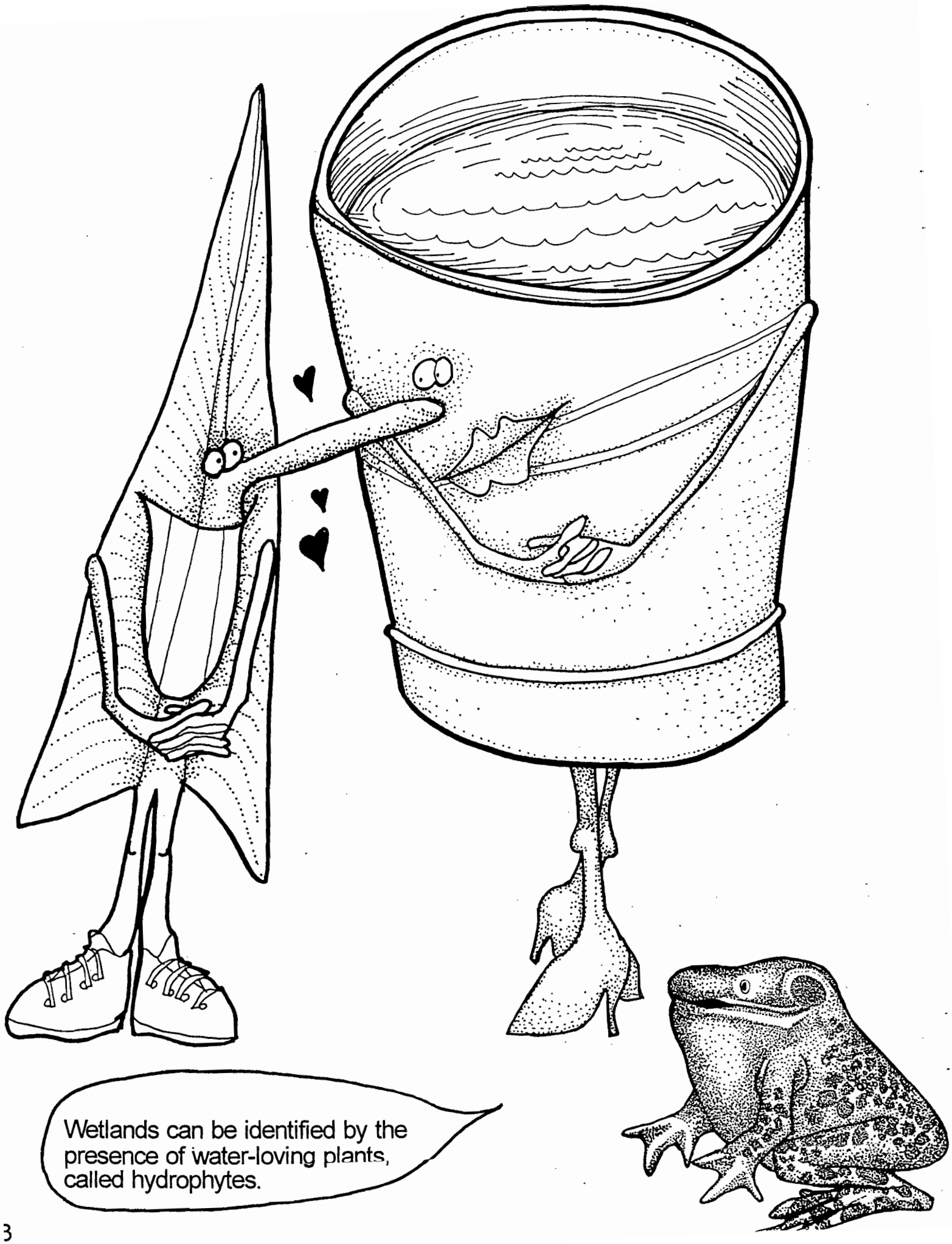


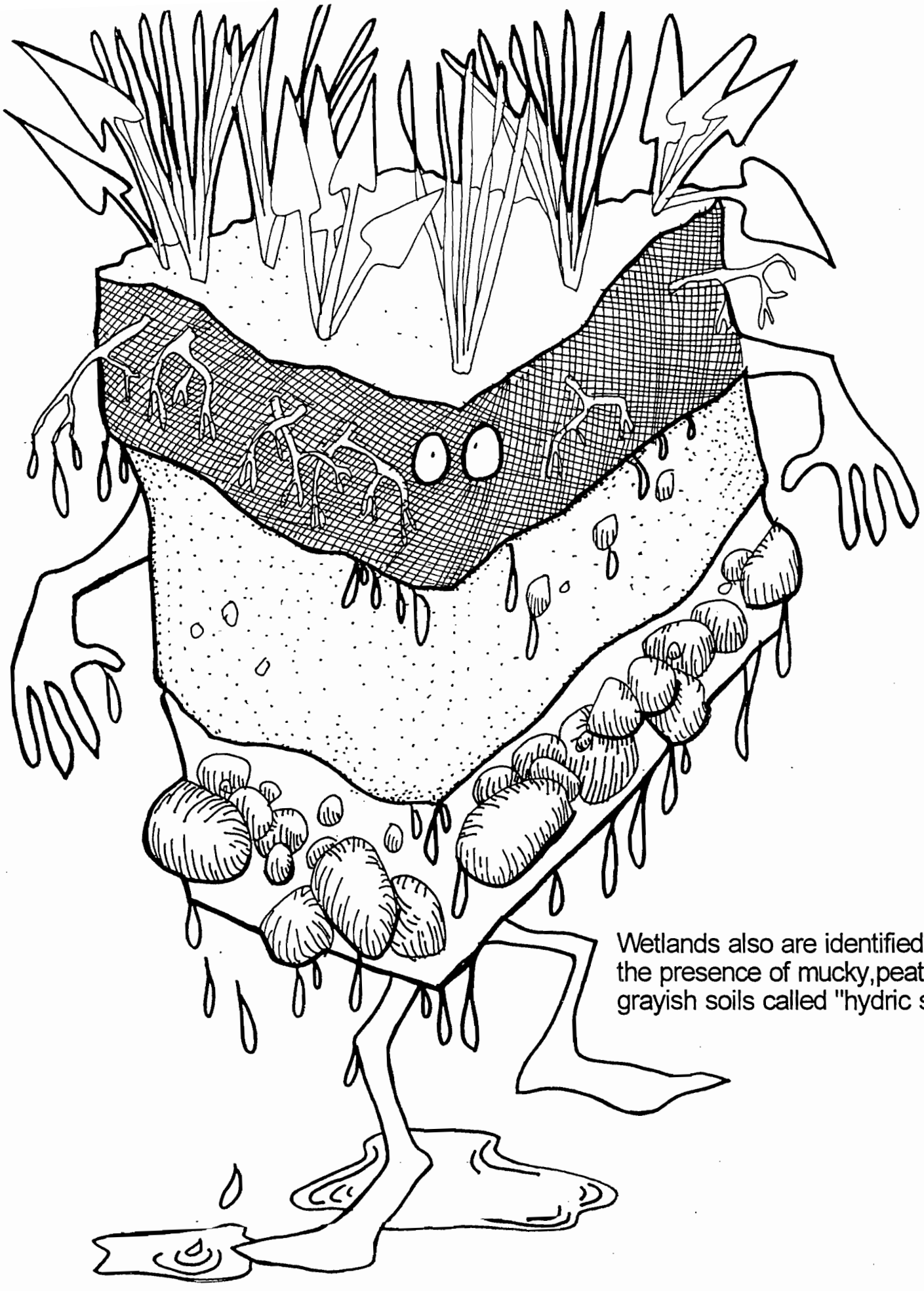


Some of this is because wetland plants use the wetland's water to grow.


Where can you find wetlands? All across the land surface where lots of water is present in or on the soil.
Some are found at the edges of lakes like Lake Garfield (Monterey).
Floodplain Wetland
Others are found along rivers such as the Connecticut, Charles, Blackstone, Concord and Merrimac Rivers.

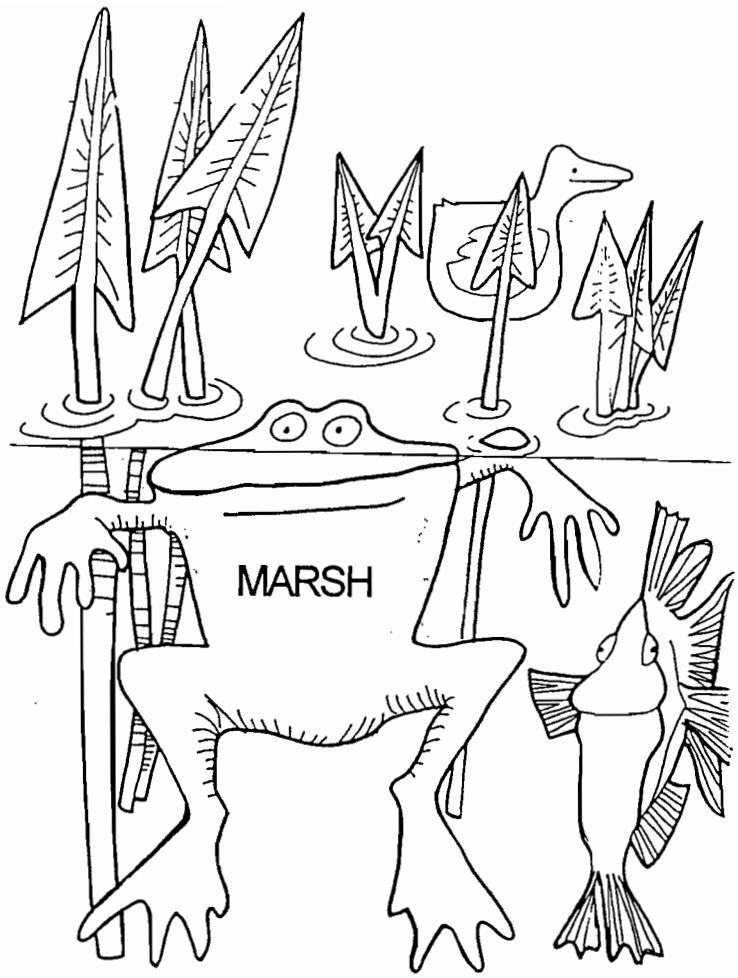

Some wetlands are up in the hills, and form where water from underground comes to the surface.
Others are found in isolated pockets, and are leftovers from glacial activity that ended 10,000 years ago.
"Kettle-hole" Bog
Salt Marsh
Dunes
And still others are found along the coast behind the sand dunes on barrier beaches (such as Plum Island and Sandy Neck (Barnstable))and along the margins of bays like Buzzards Bay, Duxbury Bay, Wellfleet Harbor and Hingham Harbor.

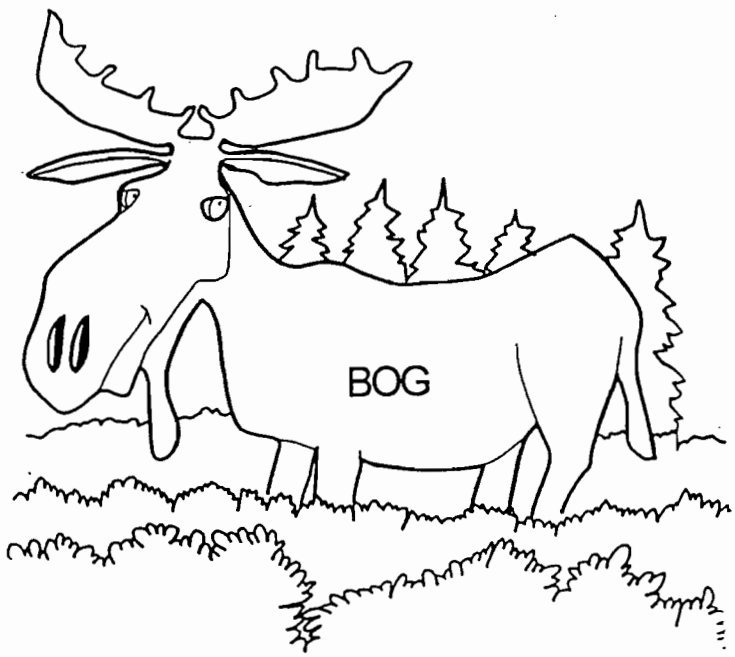

Wetlands can be identified by the presence of water-loving plants, called hydrophytes.

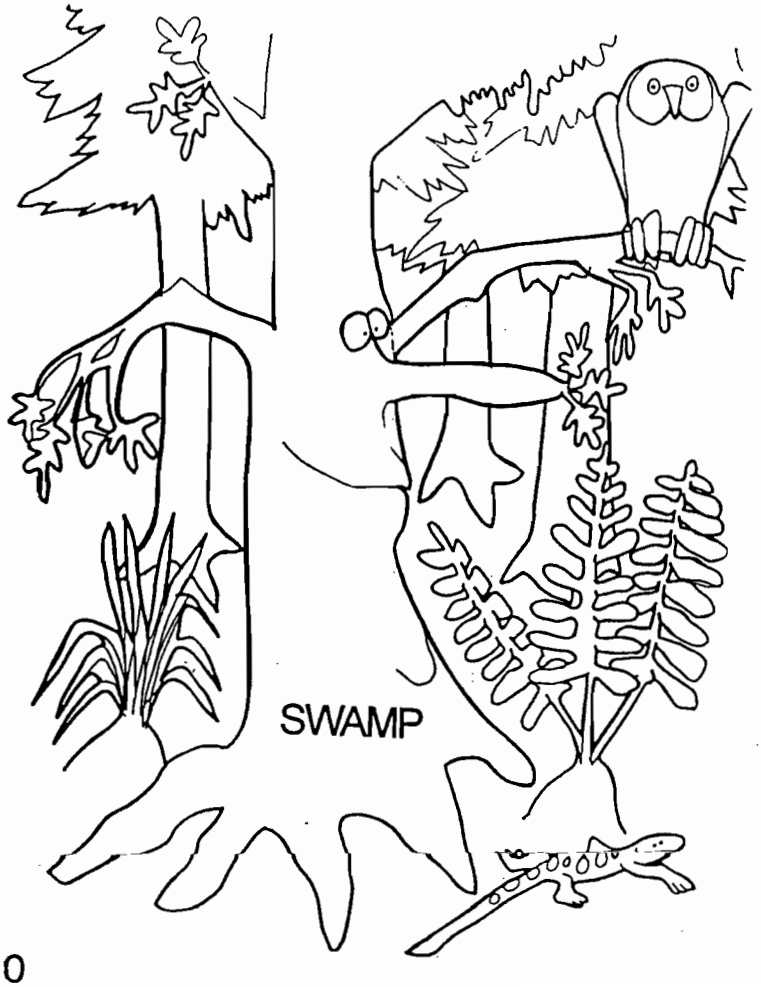


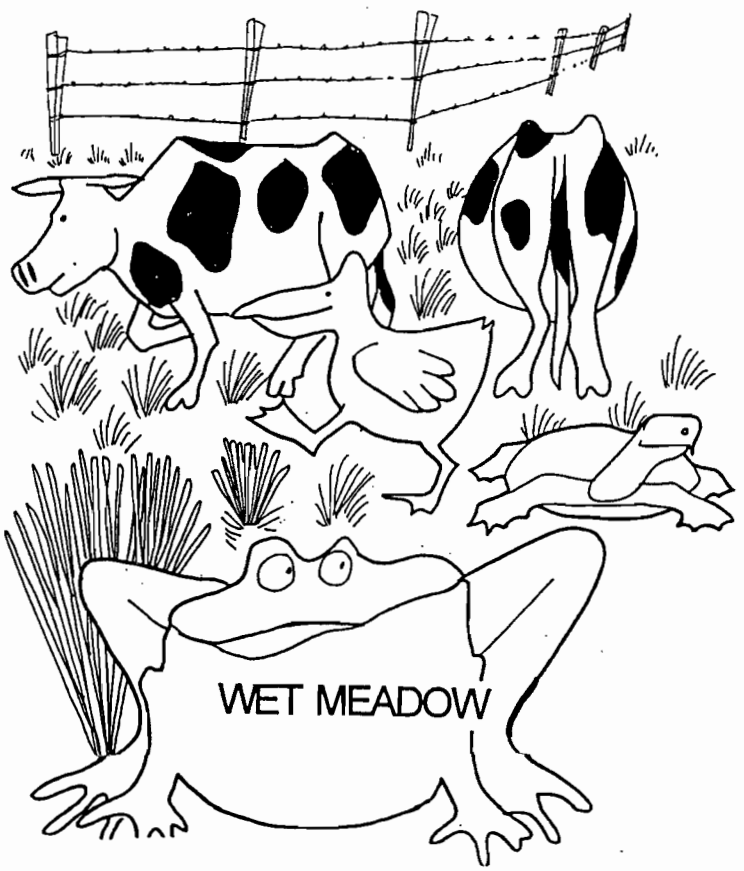
Wetlands also are identified by the presence of mucky,peaty, or grayish soils called "hydric soils"

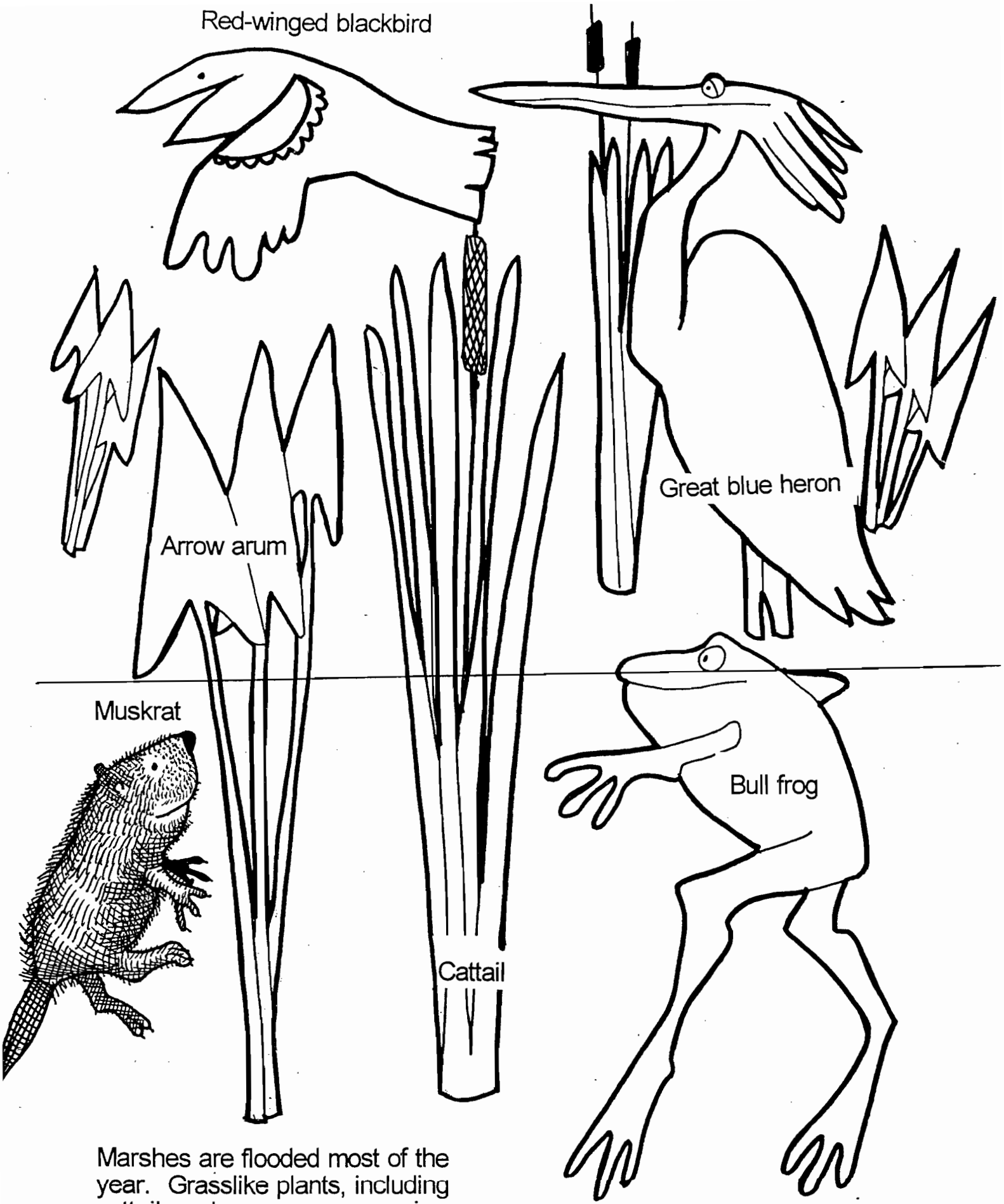
There are many different kinds of wetlands:



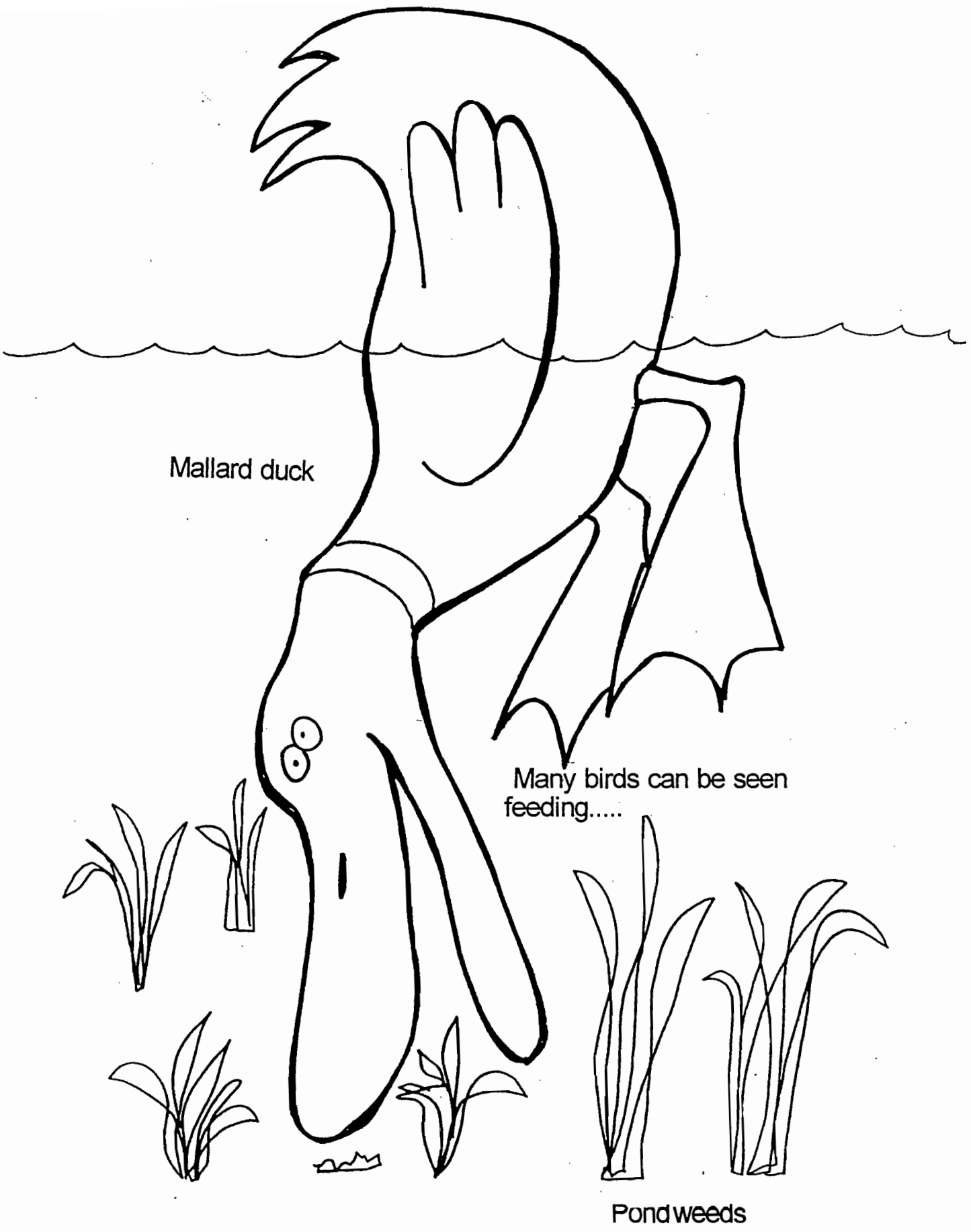




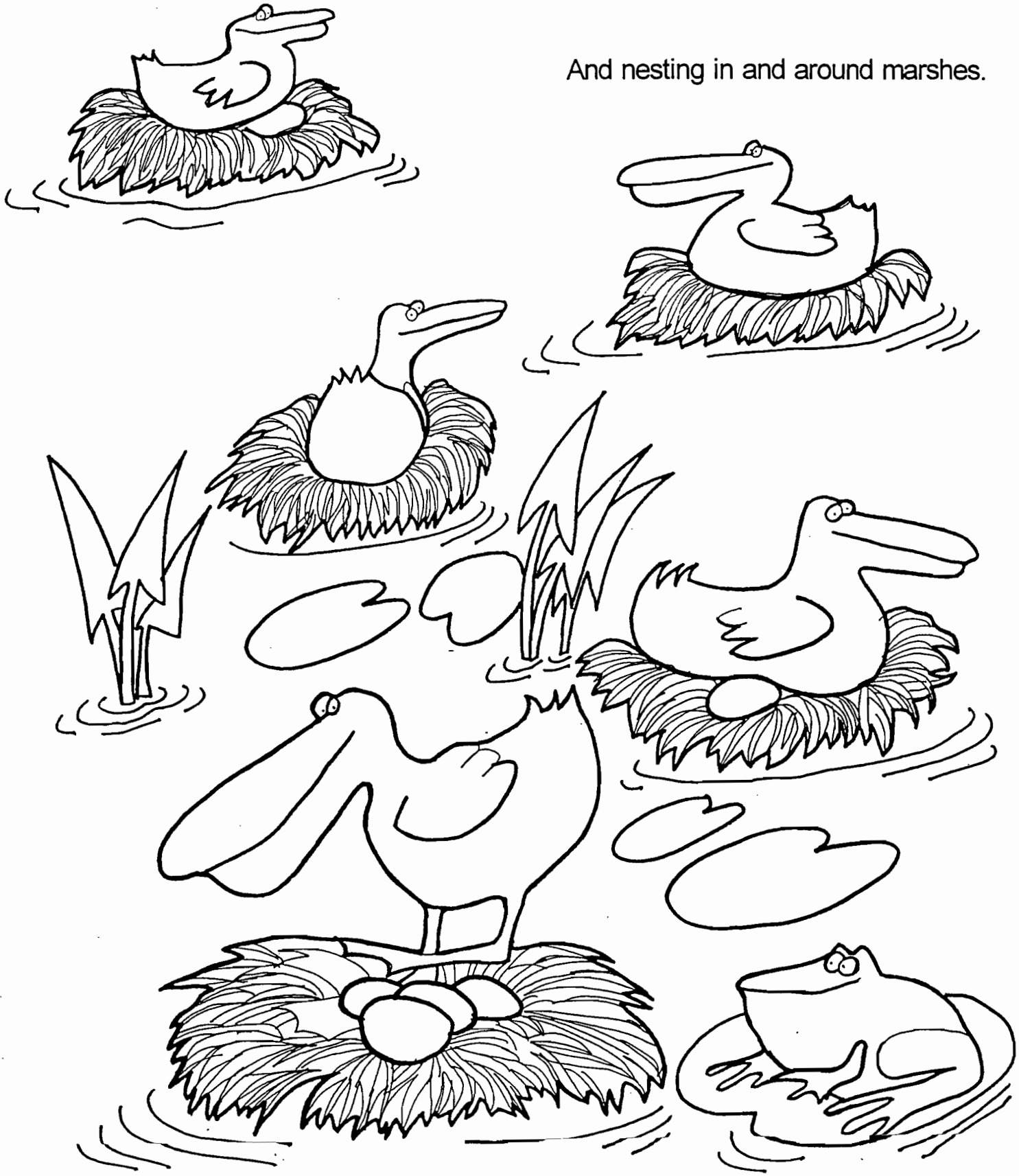




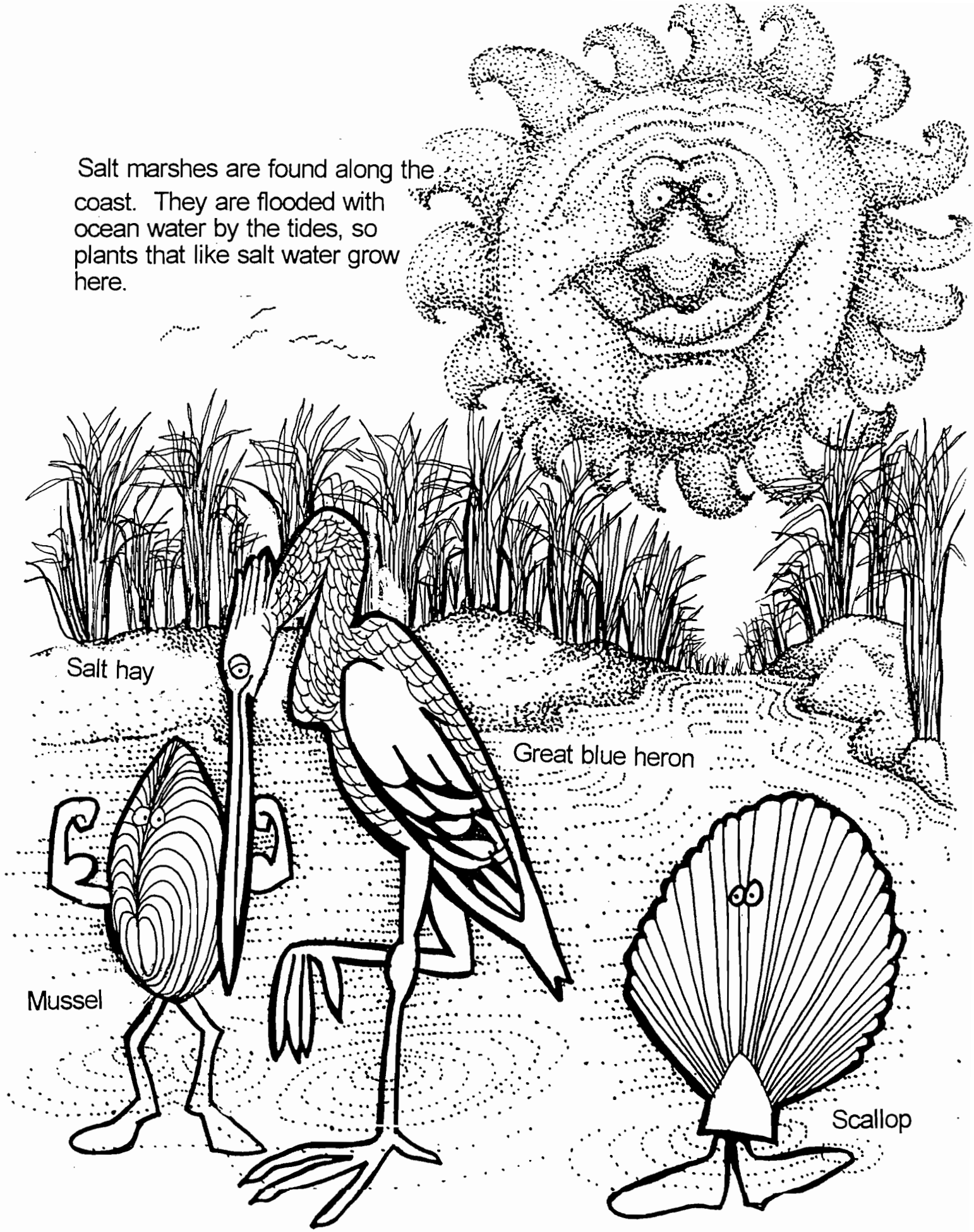
Marshes are flooded most of the year. Grasslike plants, including cattail, and arrow arum grow in this type of wetland.


Mallard duck
Many birds can be seen feeding.....
Pondweeds

And nesting in and around marshes.

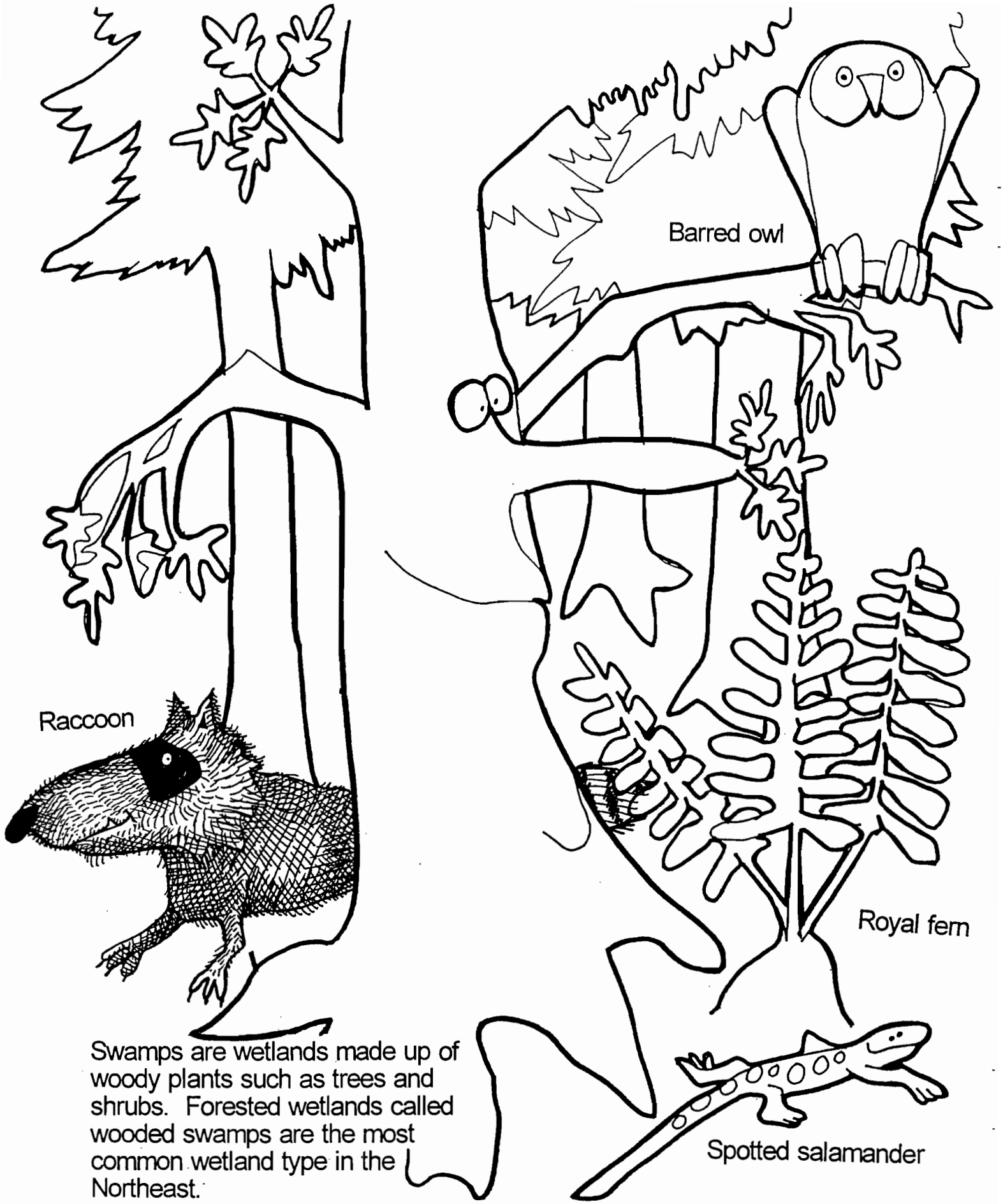


Salt marshes are found along the coast. They are flooded with ocean water by the tides, so plants that like salt water grow here.

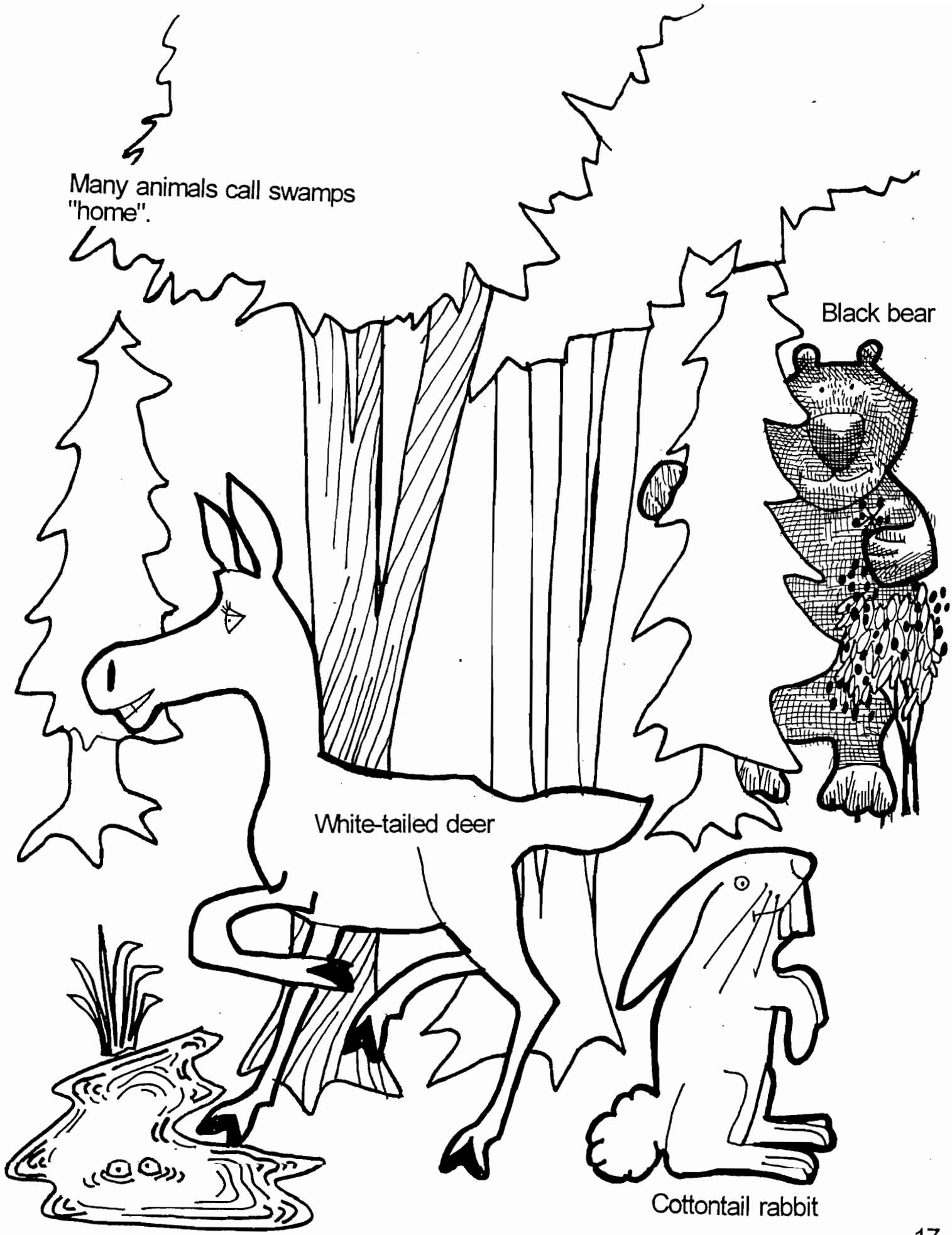


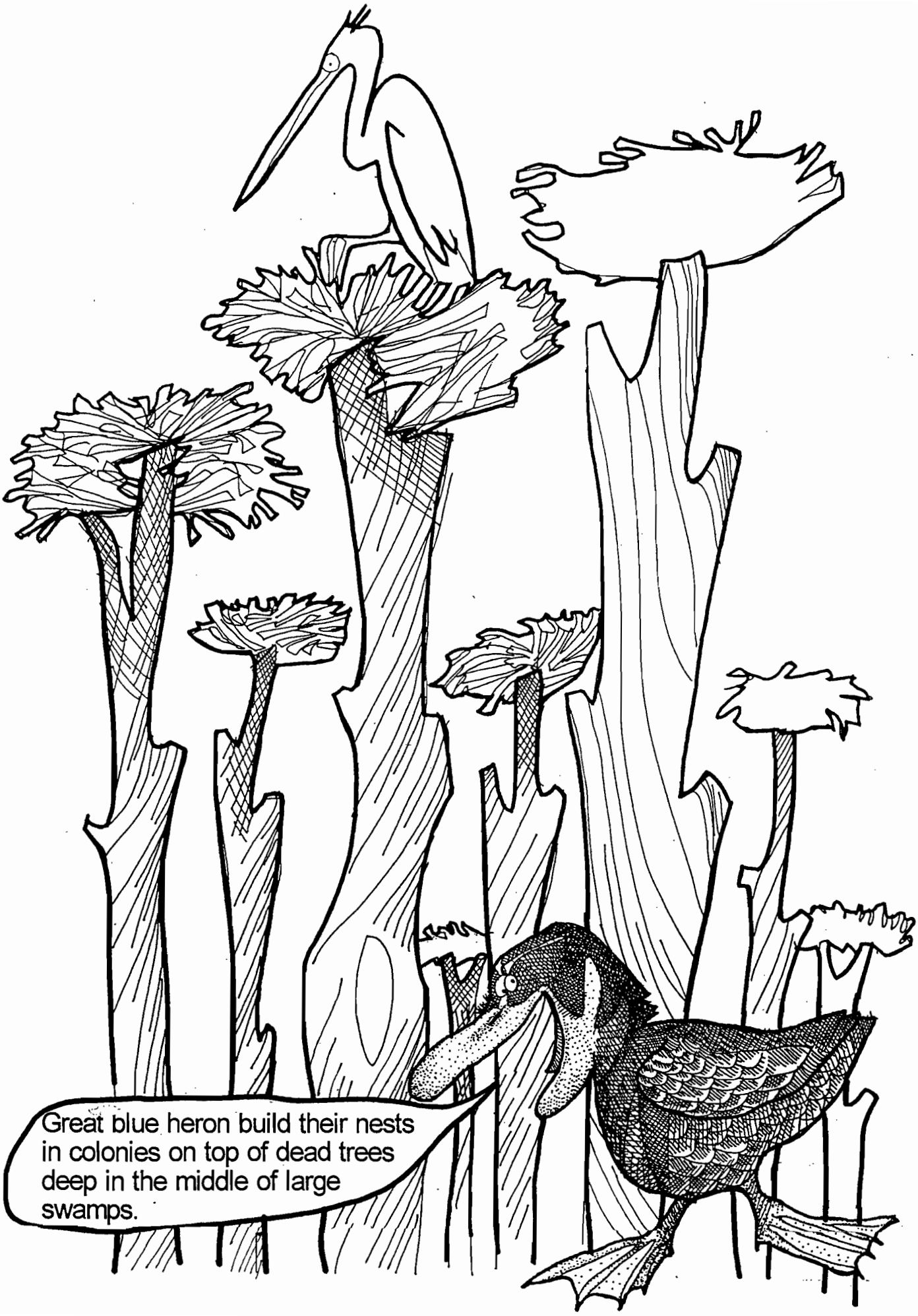
Salt marshes and their tidal creeks are important fish and shellfish nursery grounds.

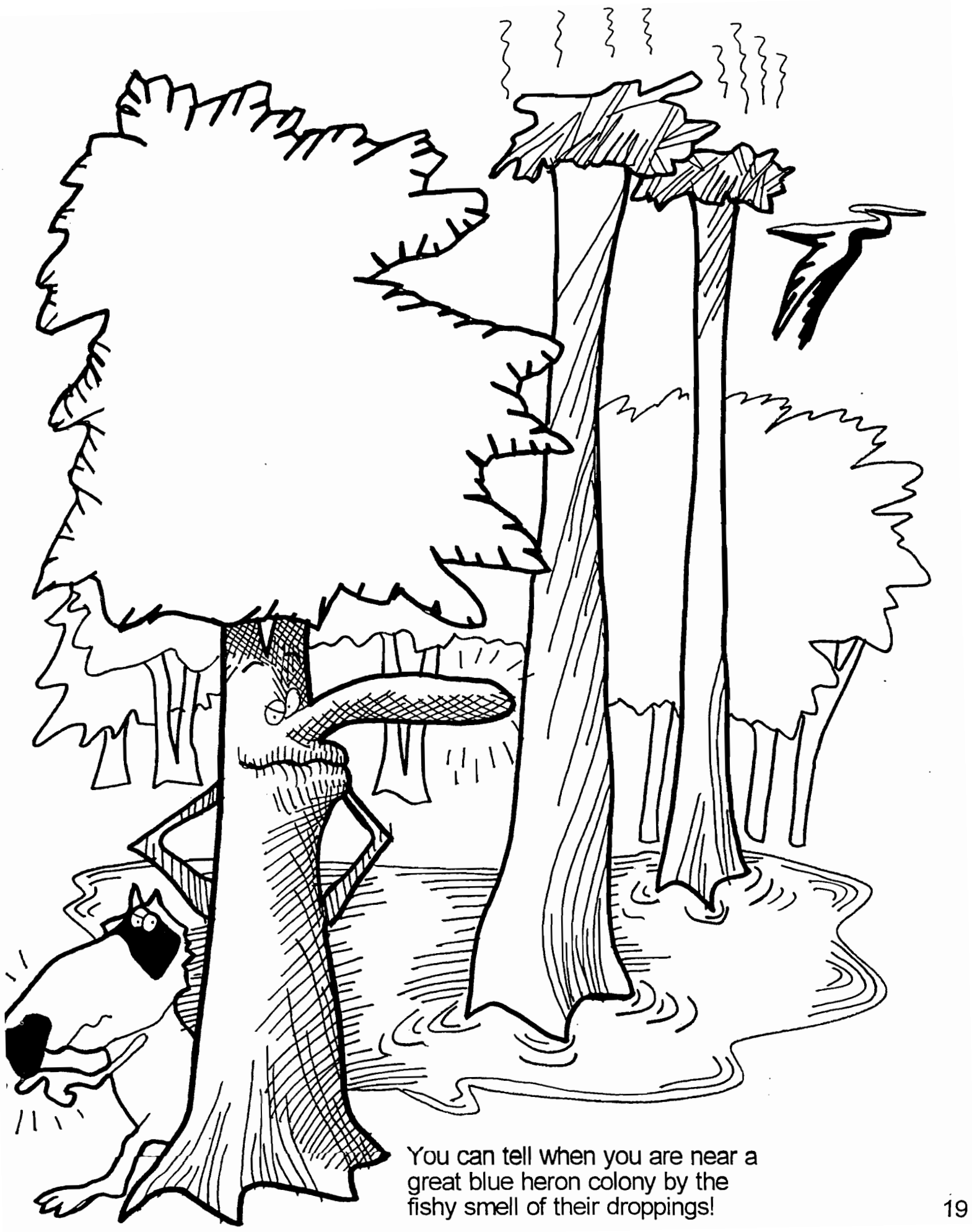
Most of the coastal fish caught by fishermen depend on tidal wetlands and estuaries.



Swamps are wetlands made up of woody plants such as trees and shrubs. Forested wetlands called wooded swamps are the most common wetland type in the Northeast.

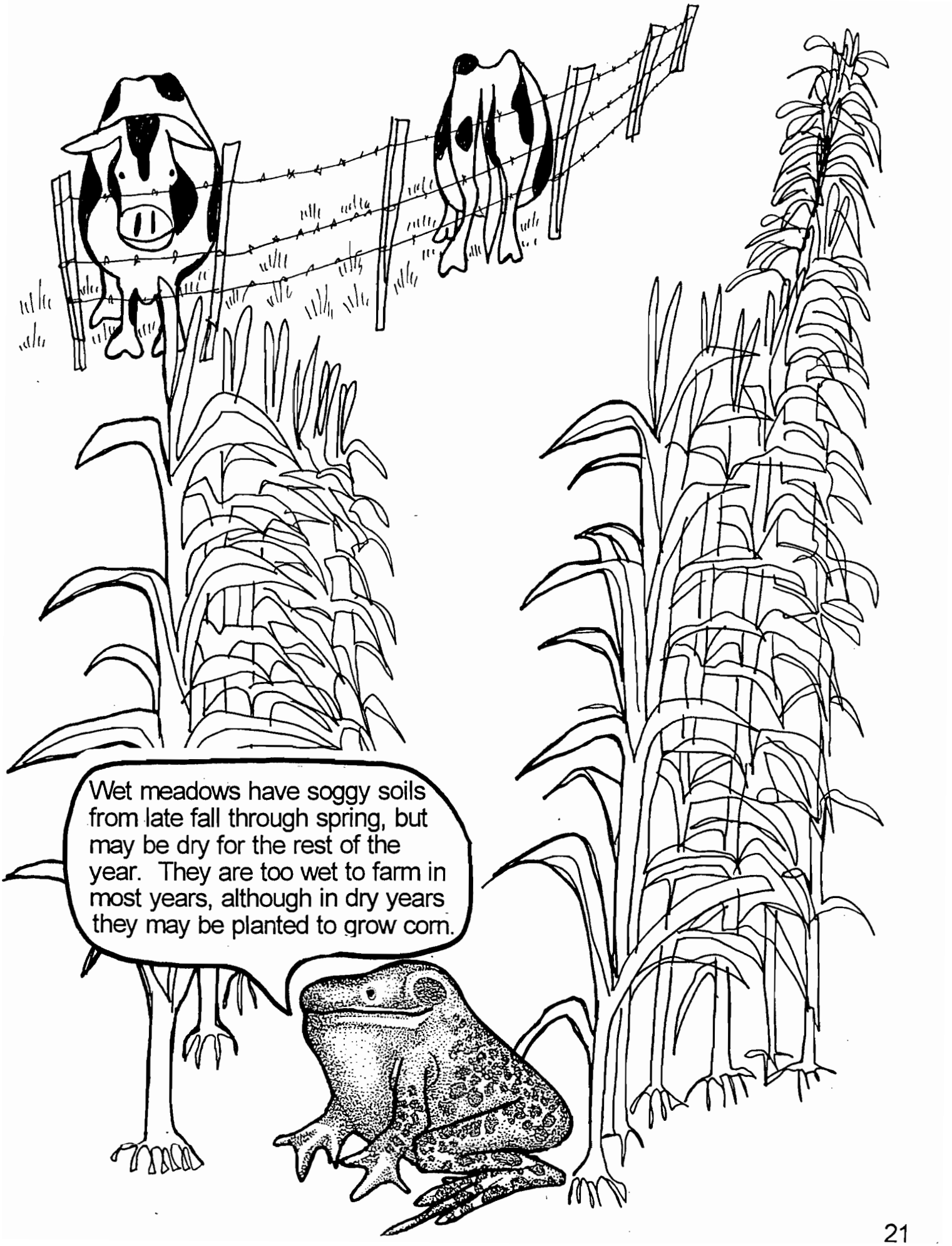

Many animals call swamps "home".
Black bear
White-tailed deer
Cottontail rabbit


Great blue heron build their nests in colonies on top of dead trees deep in the middle of large swamps.

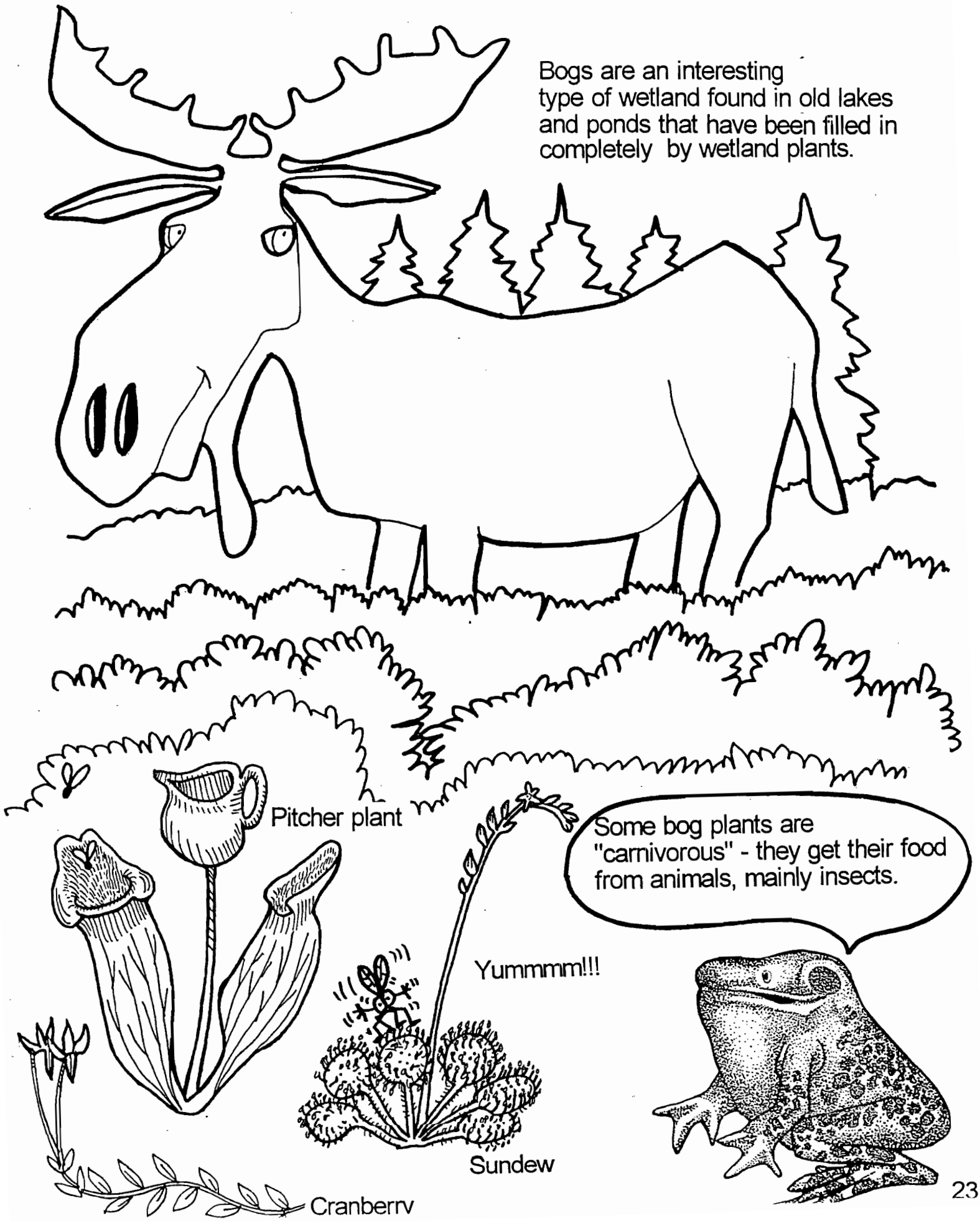


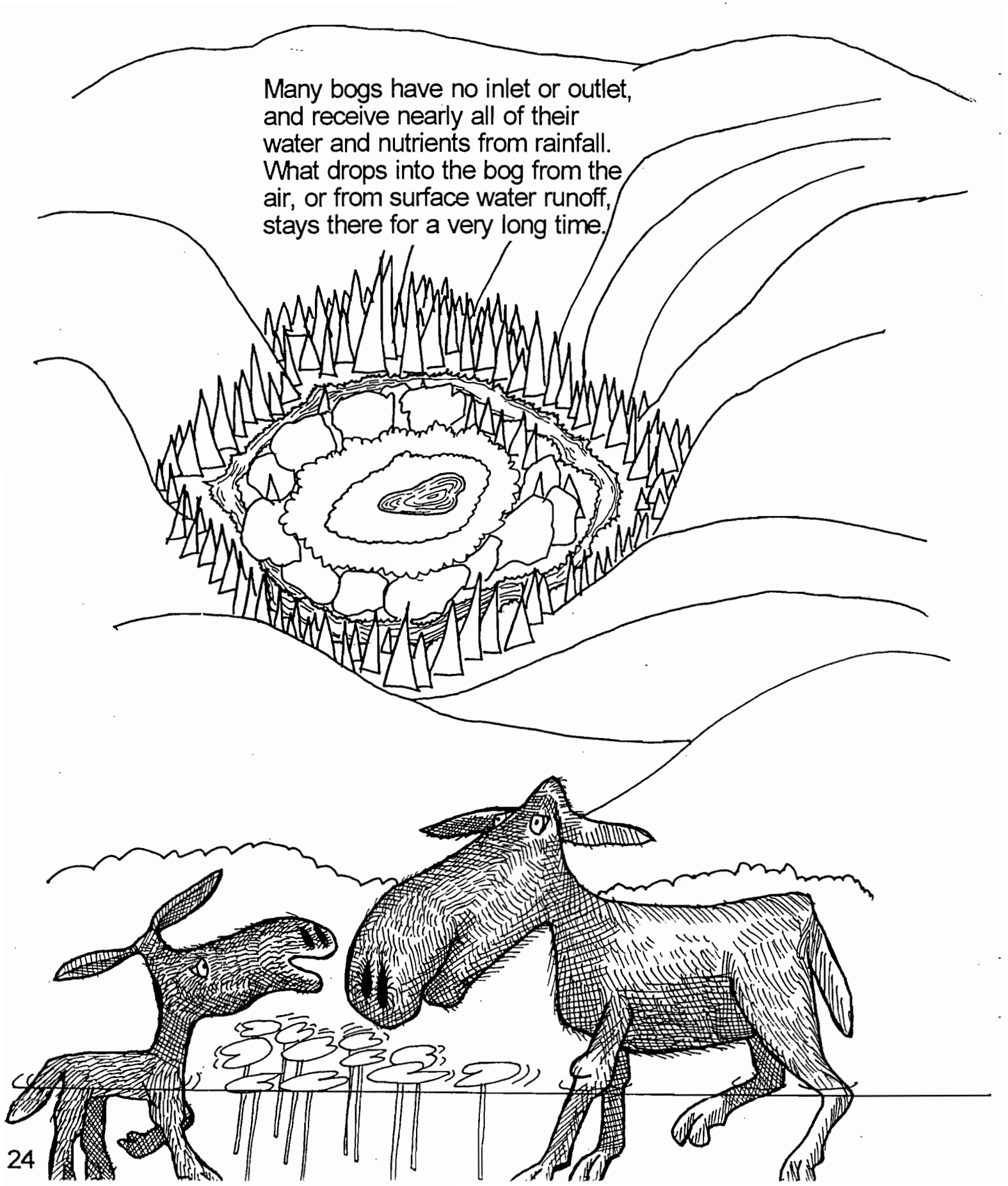
You can tell when you are near a great blue heron colony by the fishy smell of their droppings!

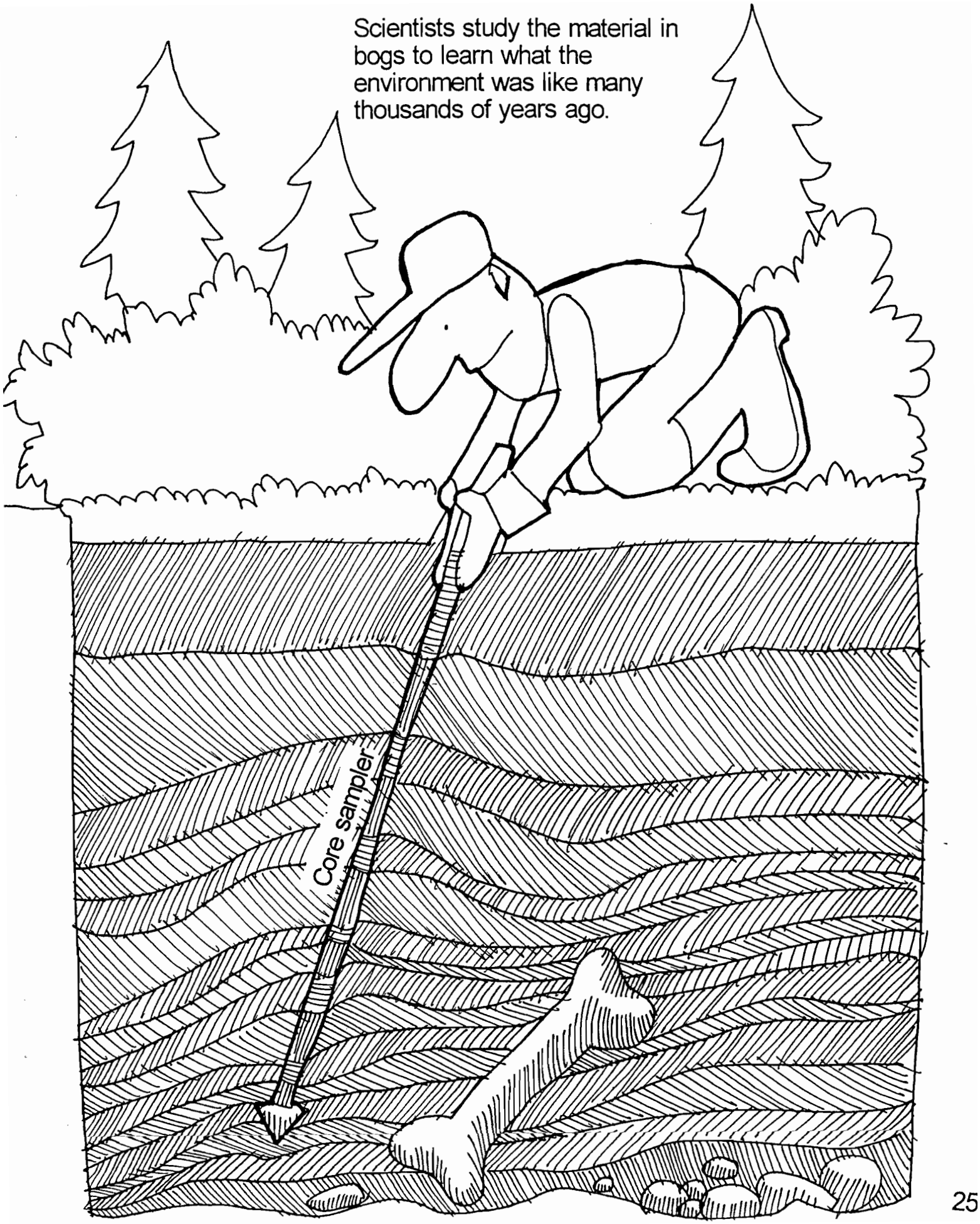

Wet meadows are found in farming areas. They were originally swamps, but the trees were cut for firewood or lumber and now the areas are either mowed for hay, or grazed by cows.

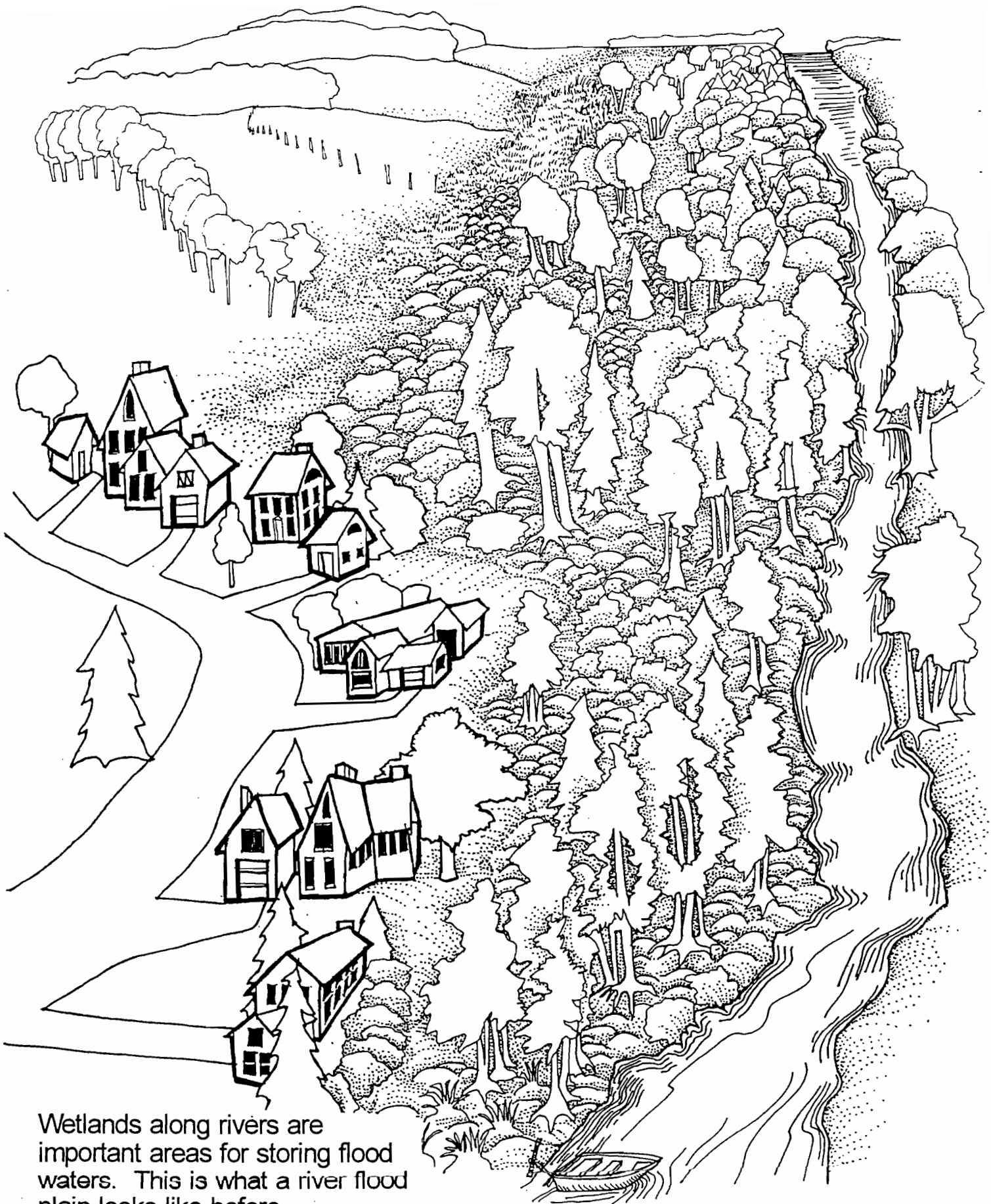

Wet meadows have soggy soils from late fall through spring, but may be dry for the rest of the year. They are too wet to farm in most years, although in dry years they may be planted to grow corn.


Some meadows have become overgrown with woody plants and have returned to being swamps.


Bogs are an interesting type of wetland found in old lakes and ponds that have been filled in completely by wetland plants.
Pitcher plant
Some bog plants are "carnivorous" - they get their food from animals, mainly insects.
Yummmm!!!
Sundew
Cranberry

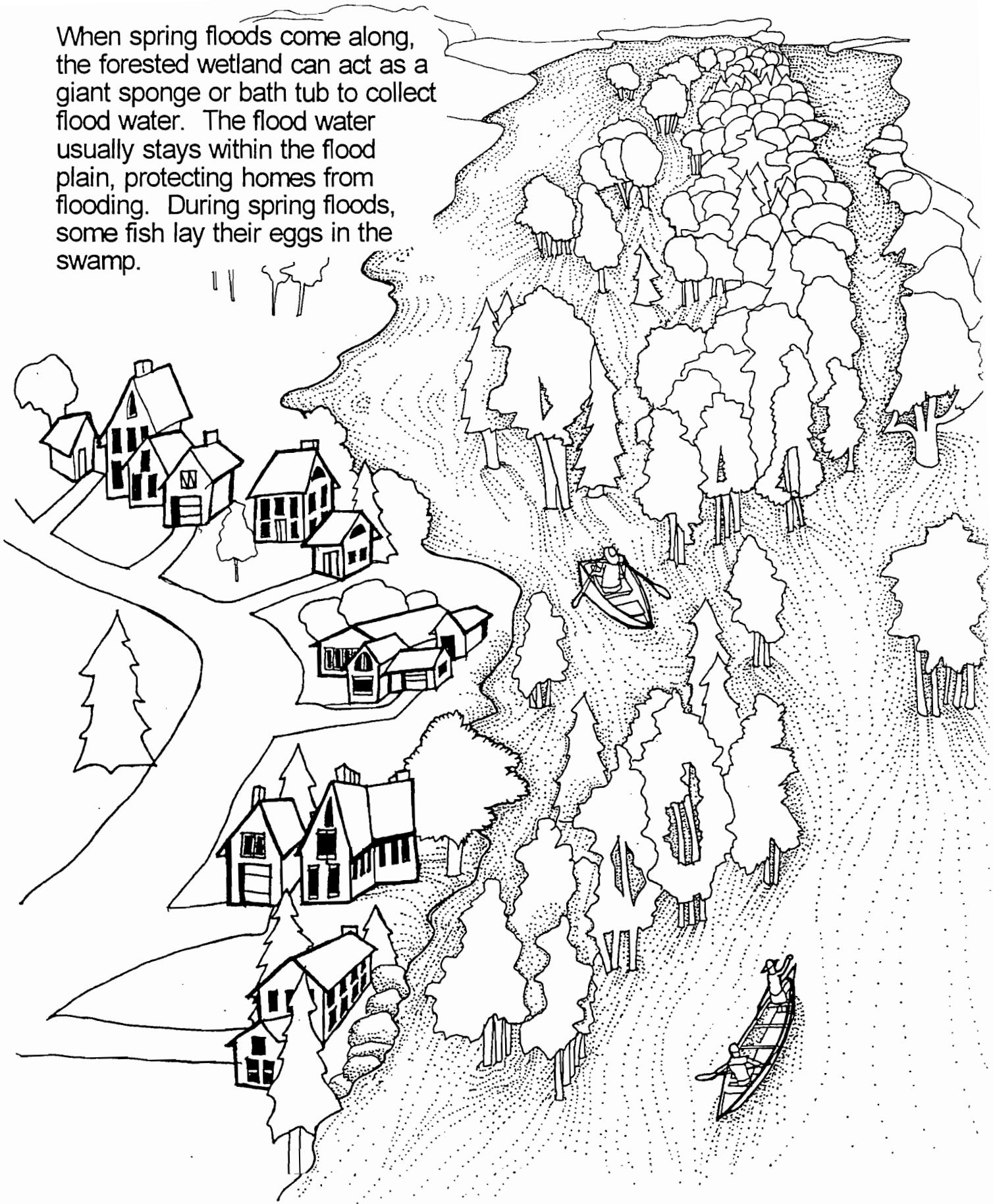

Many bogs have no inlet or outlet,
and receive nearly all of their
water and nutrients from rainfall.
What drops into the bog from the
air, or from surface water runoff,
stays there for a very long time.

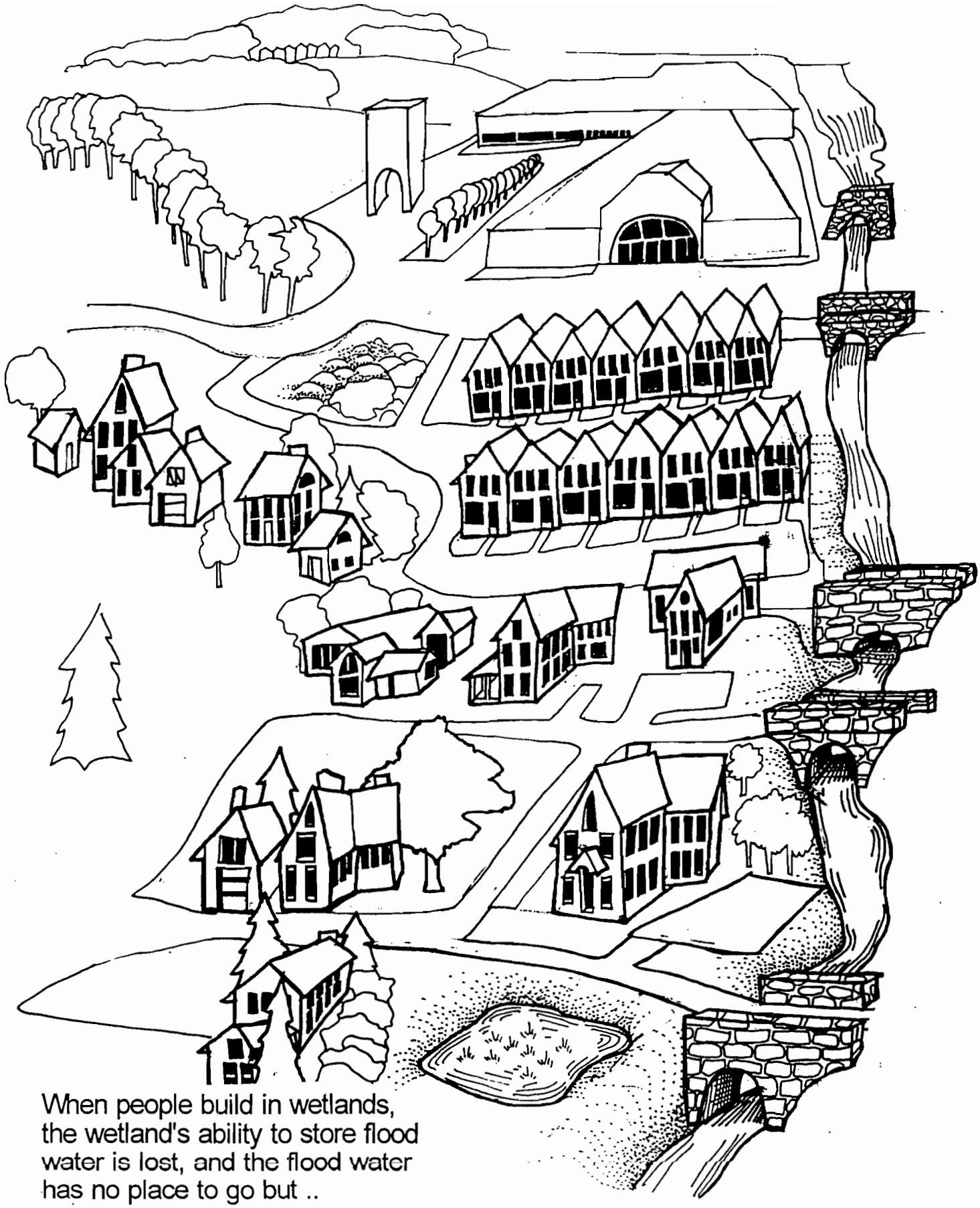

Scientists study the material in bogs to learn what the environment was like many thousands of years ago.
Core sampler



Wetlands along rivers are important areas for storing flood waters. This is what a river flood plain looks like before development crowds in.

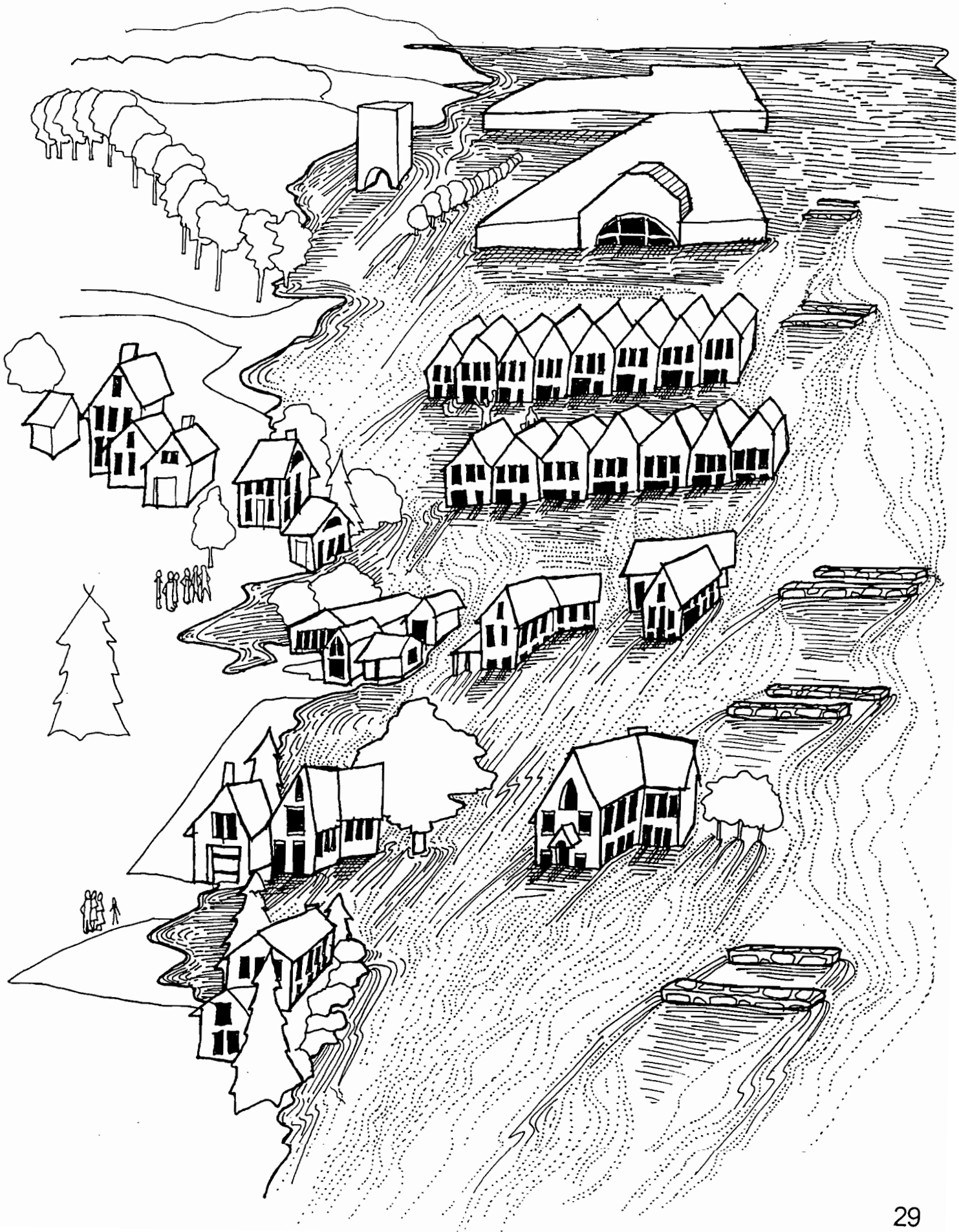
When spring floods come along, the forested wetland can act as a giant sponge or bath tub to collect flood water. The flood water usually stays within the flood plain, protecting homes from flooding. During spring floods, some fish lay their eggs in the swamp.



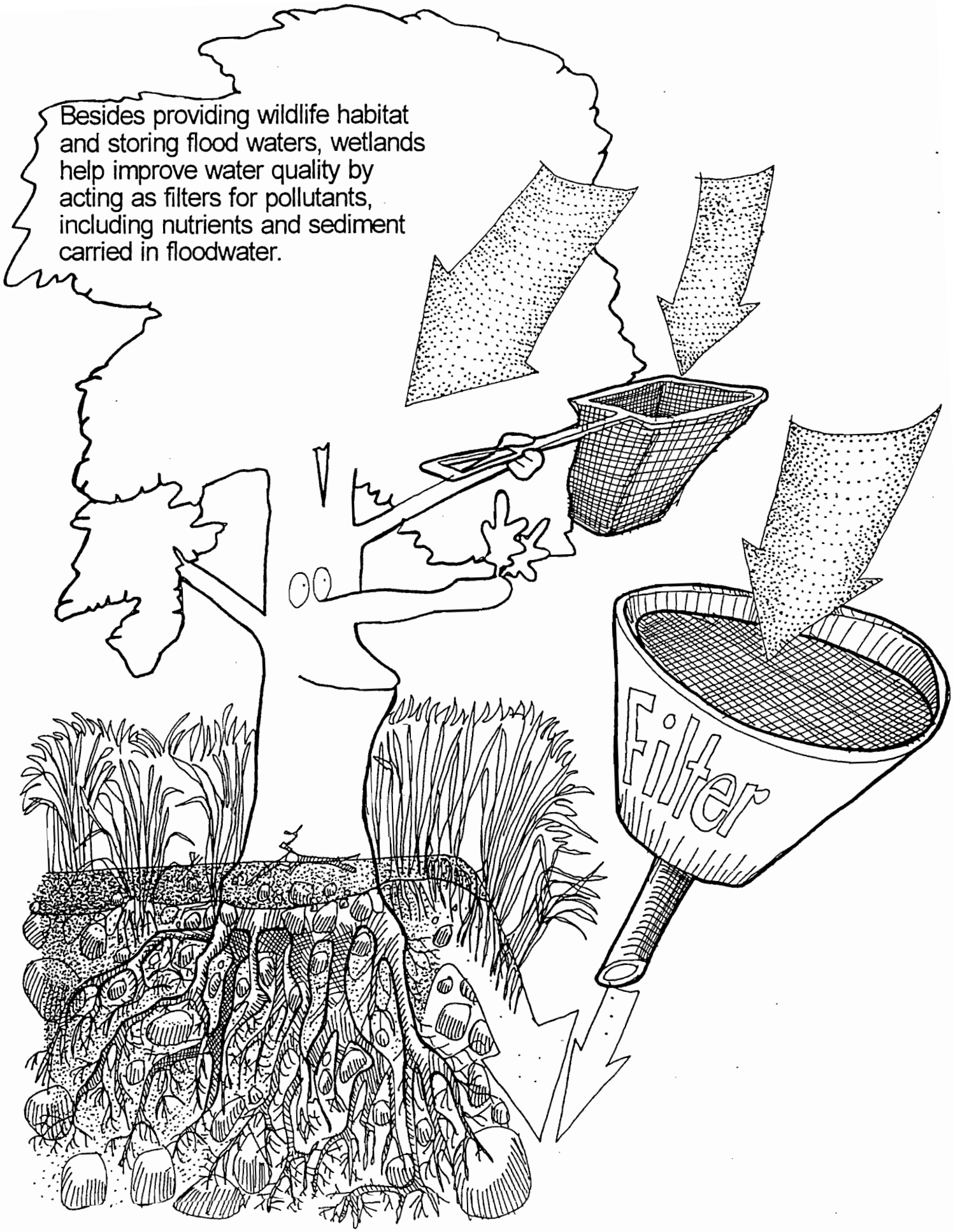


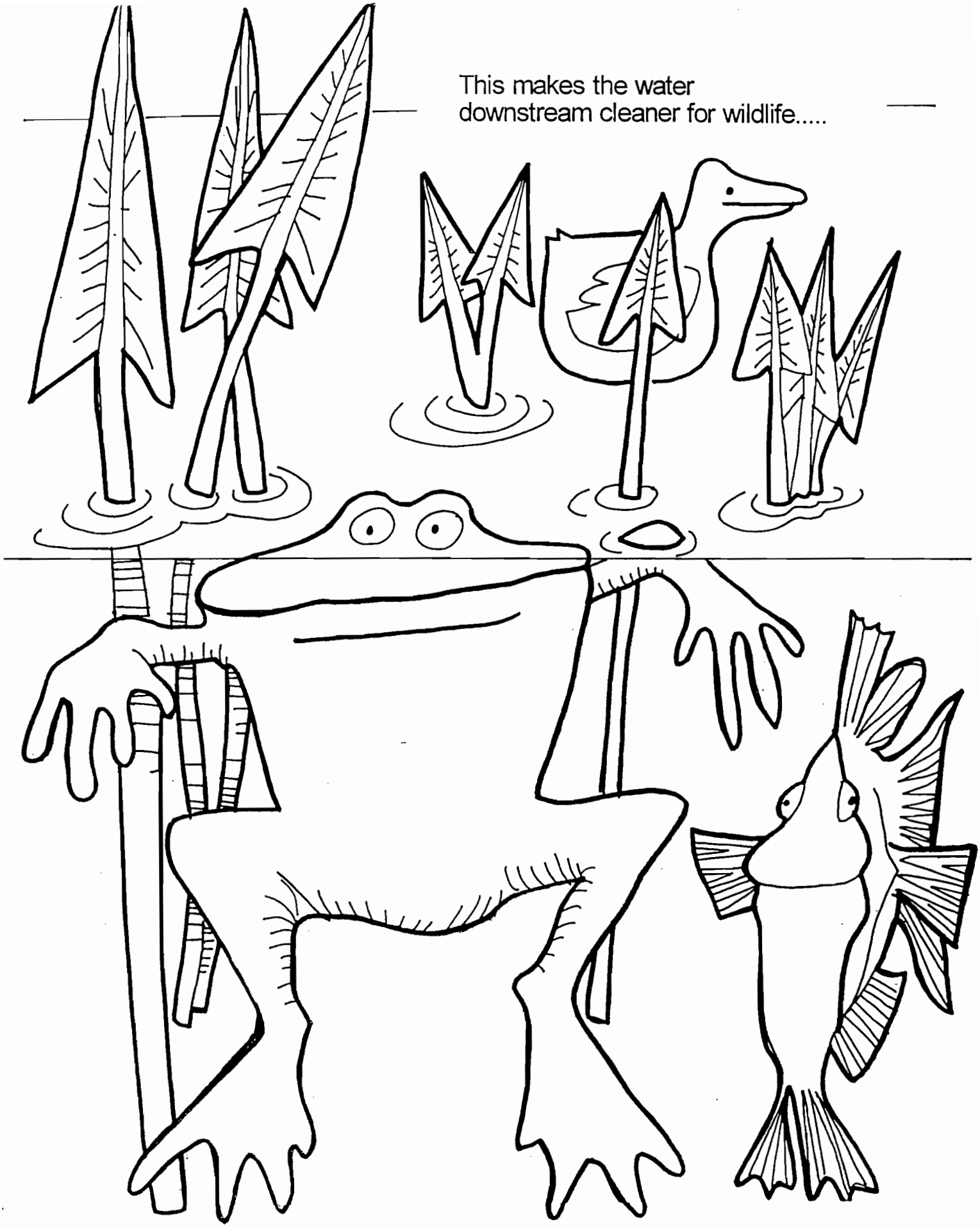
When people build in wetlands, the wetland's ability to store flood water is lost, and the flood water has no place to go but ..

...to flood homes and businesses.

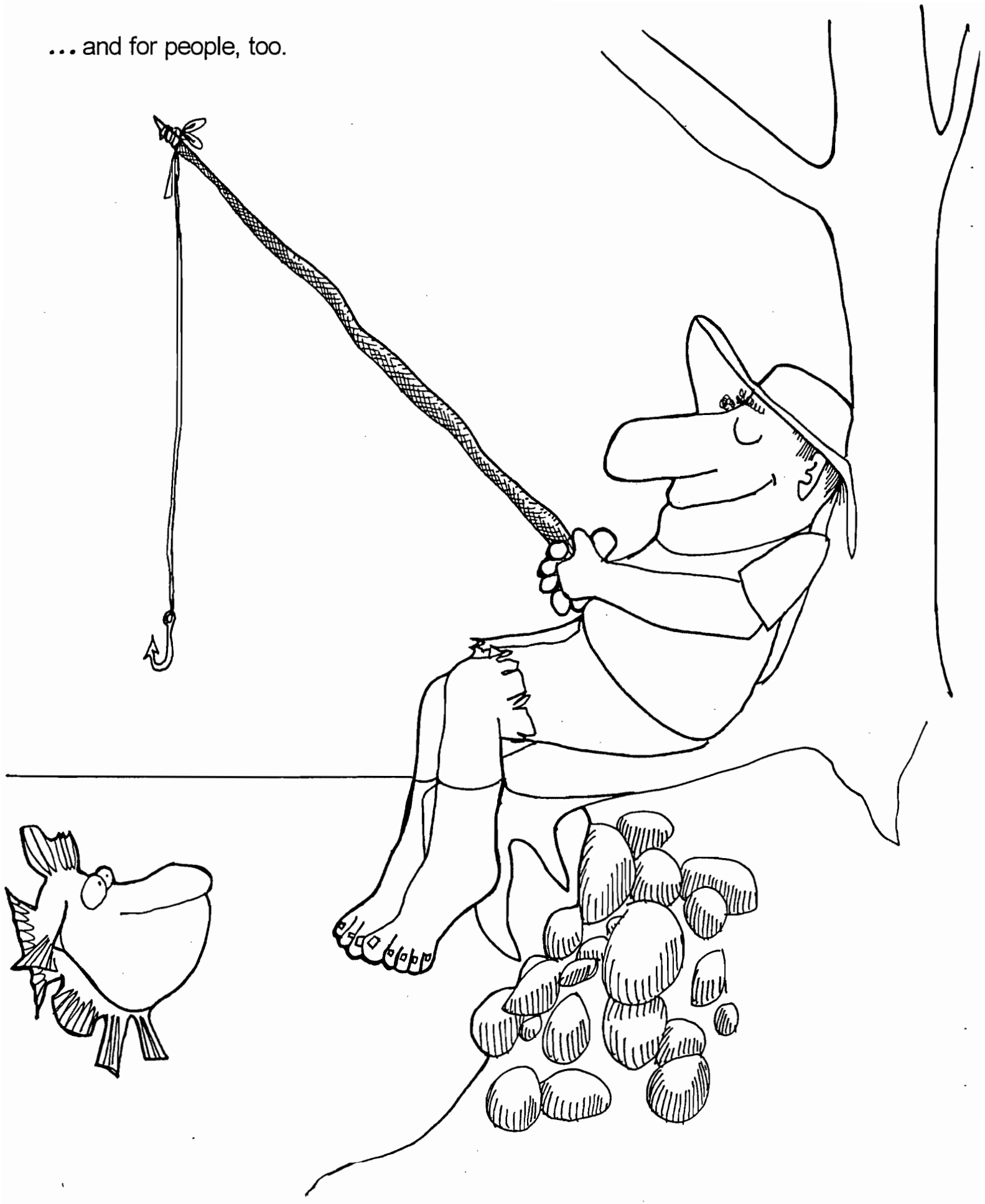


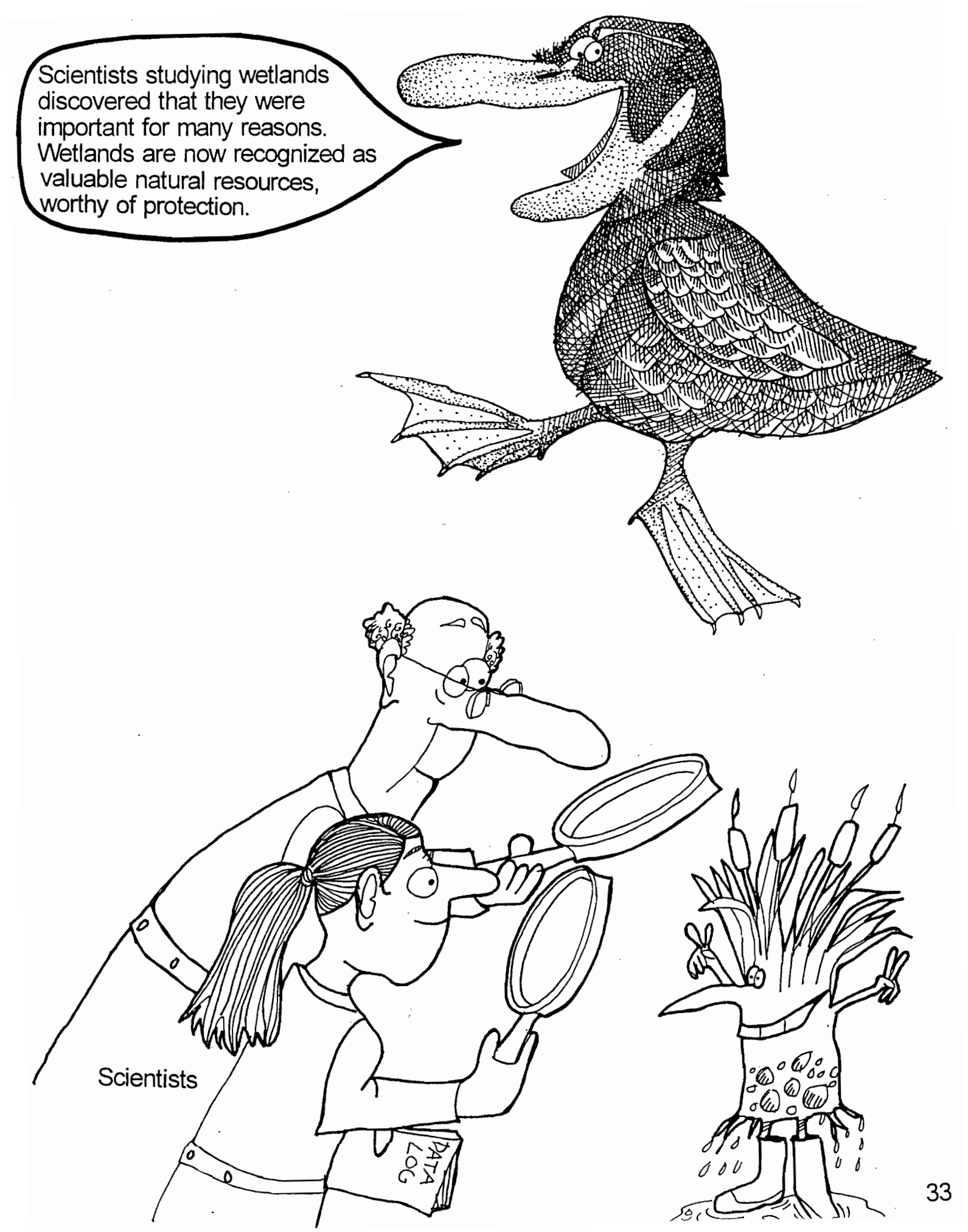
Besides providing wildlife habitat and storing flood waters, wetlands help improve water quality by acting as filters for pollutants, including nutrients and sediment carried in floodwater.




This makes the water
downstream cleaner for wildlife.....

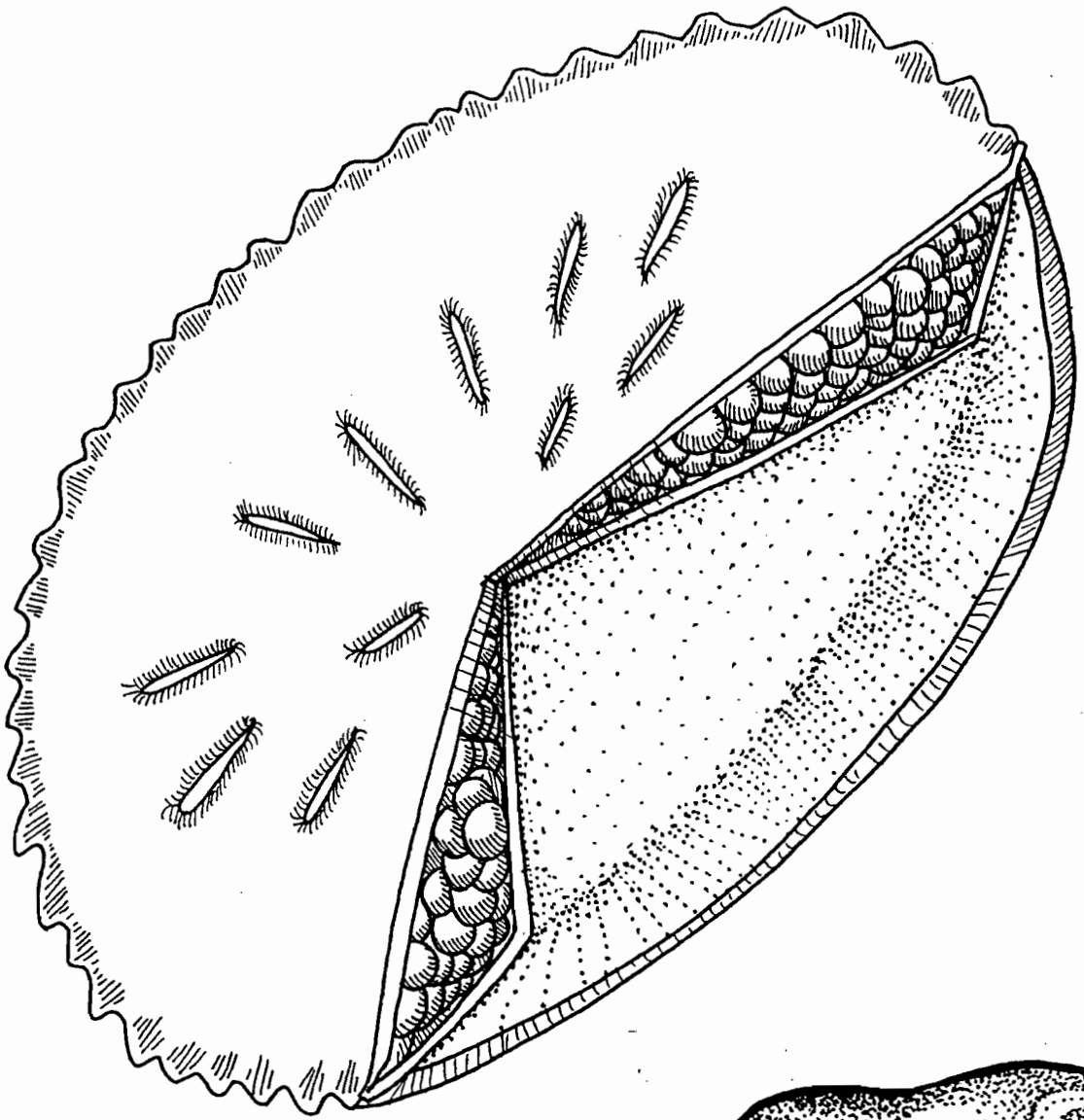
... and for people, too.

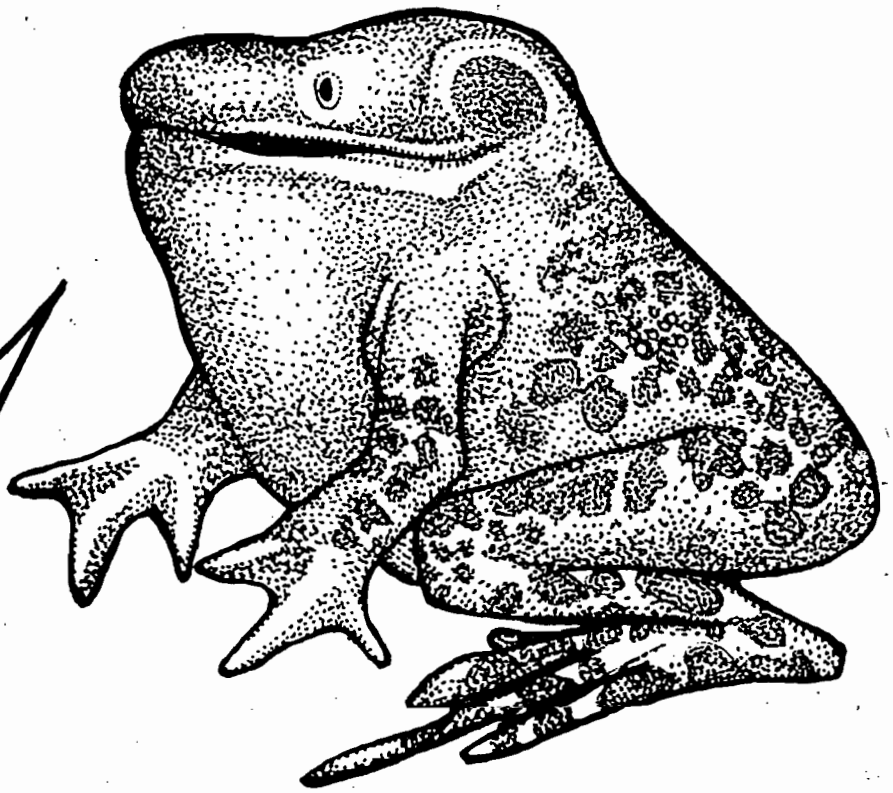



Scientists studying wetlands discovered that they were important for many reasons. Wetlands are now recognized as valuable natural resources, worthy of protection.
Scientists
DATA LOG

But in the past, wetlands were viewed as wastelands because they were too wet to farm or build on. People felt that most wetlands had no value unless they were drained or filled.

Over the years as their wetland homes were destroyed, wildlife had no choice but to leave and try to find <u>new</u> homes if they could.

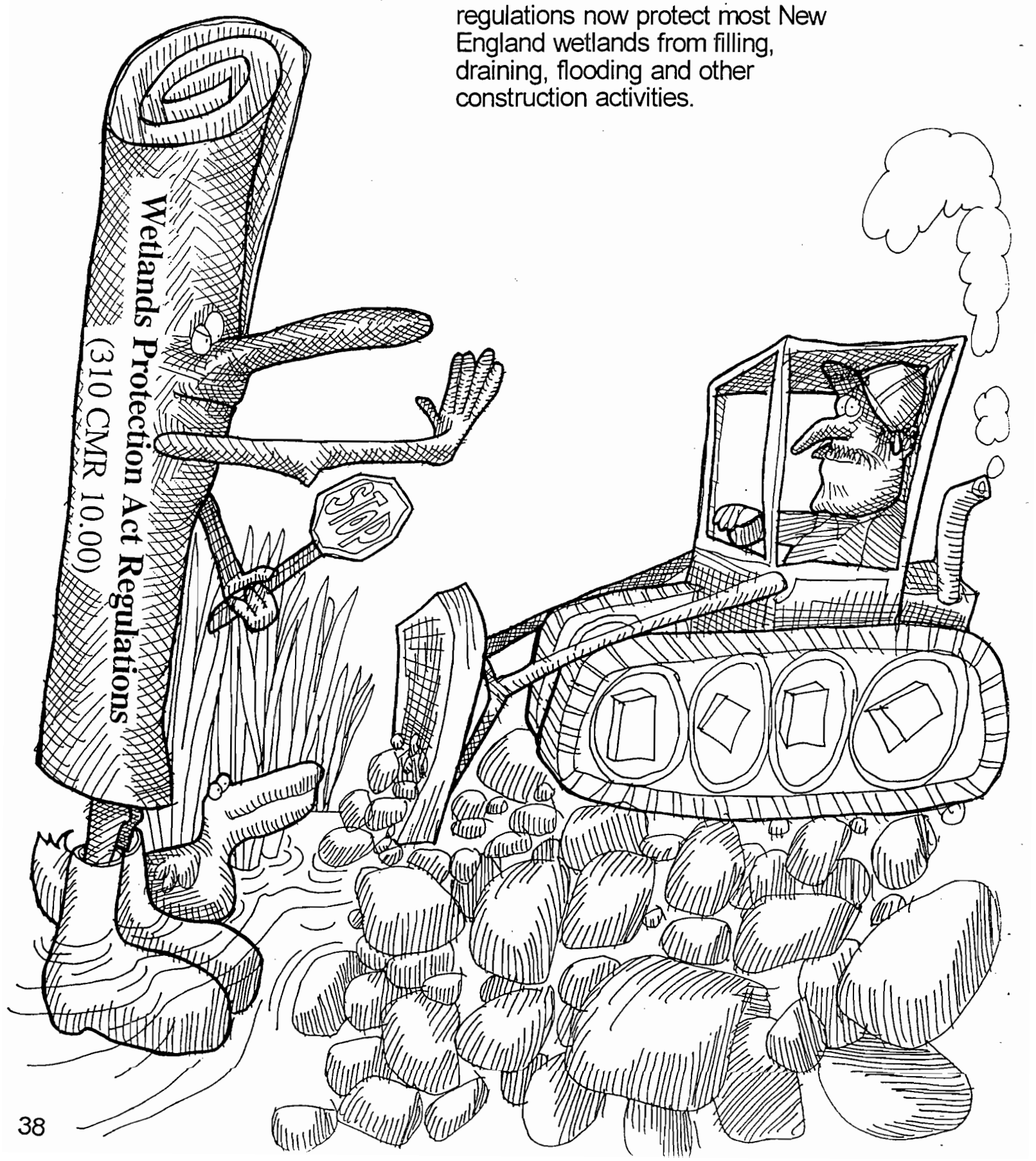




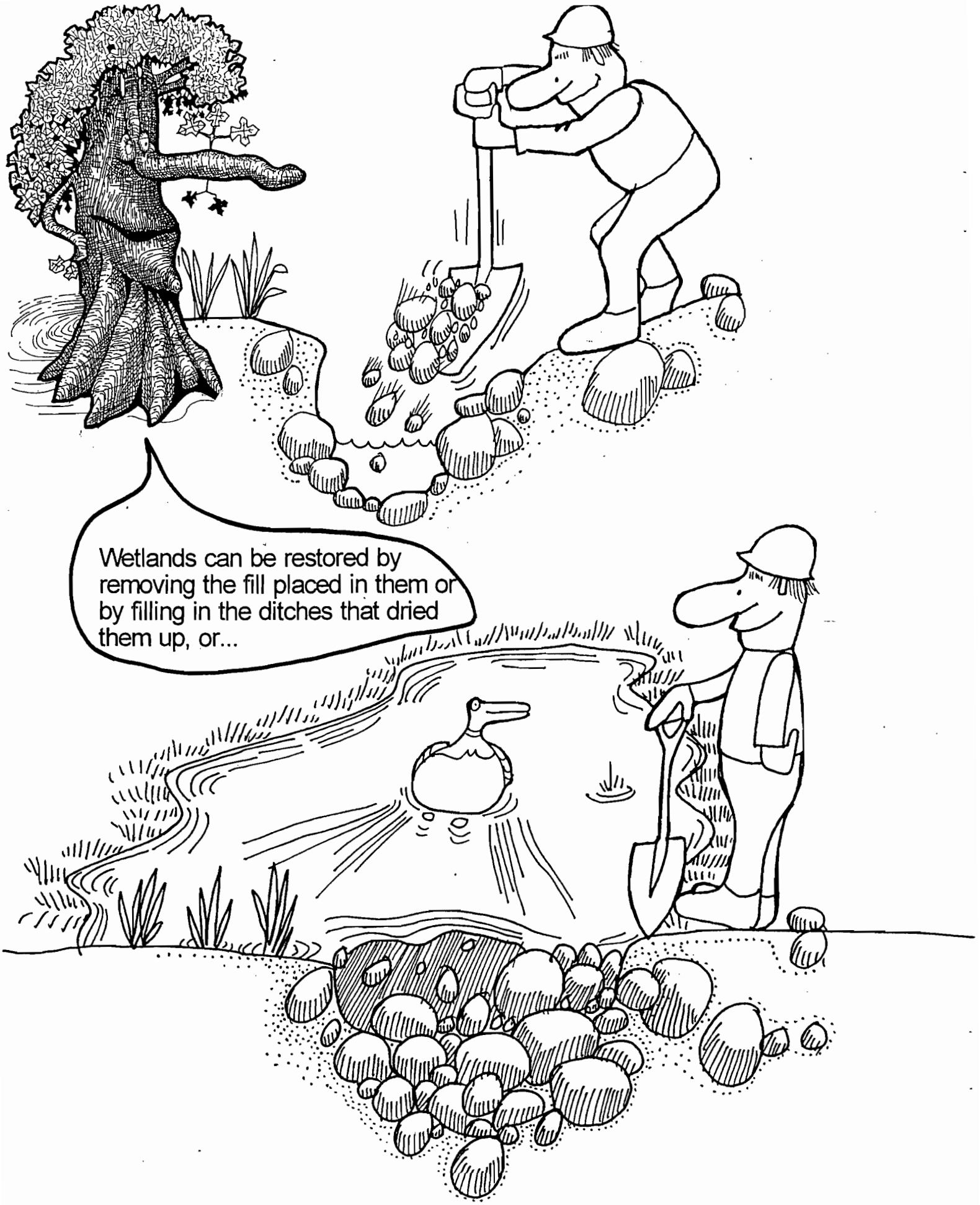
In Massachusetts, almost a third of the wetlands present when the Pilgrims arrived have been destroyed. About 600,000 acres remain.

Much of Boston was built by filling salt marshes and tidal flats of the Back Bay. Fenway Park is named after wetlands that now lie buried deep beneath the ballpark.

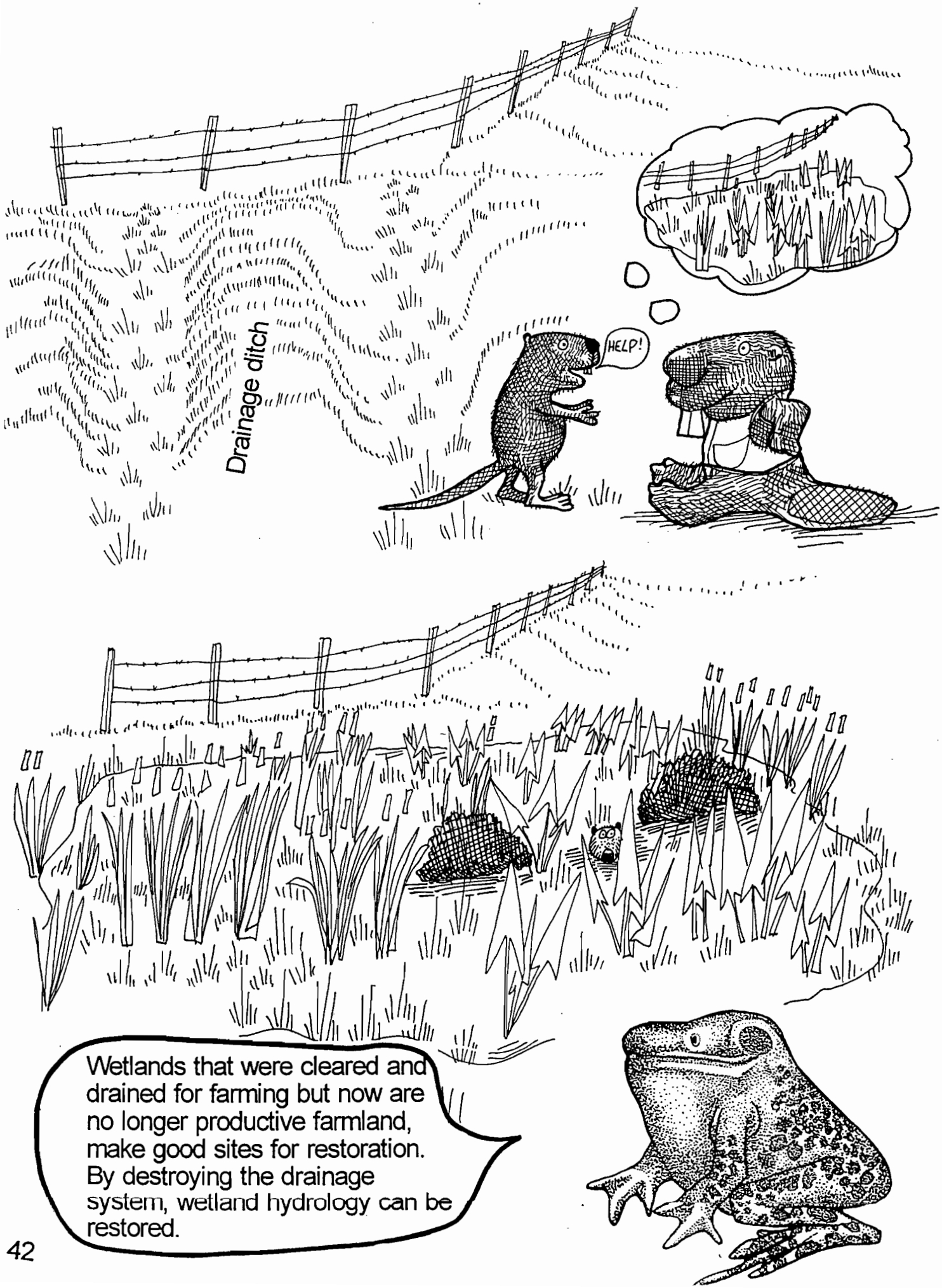
State and Federal laws and regulations now protect most New England wetlands from filling, draining, flooding and other construction activities.



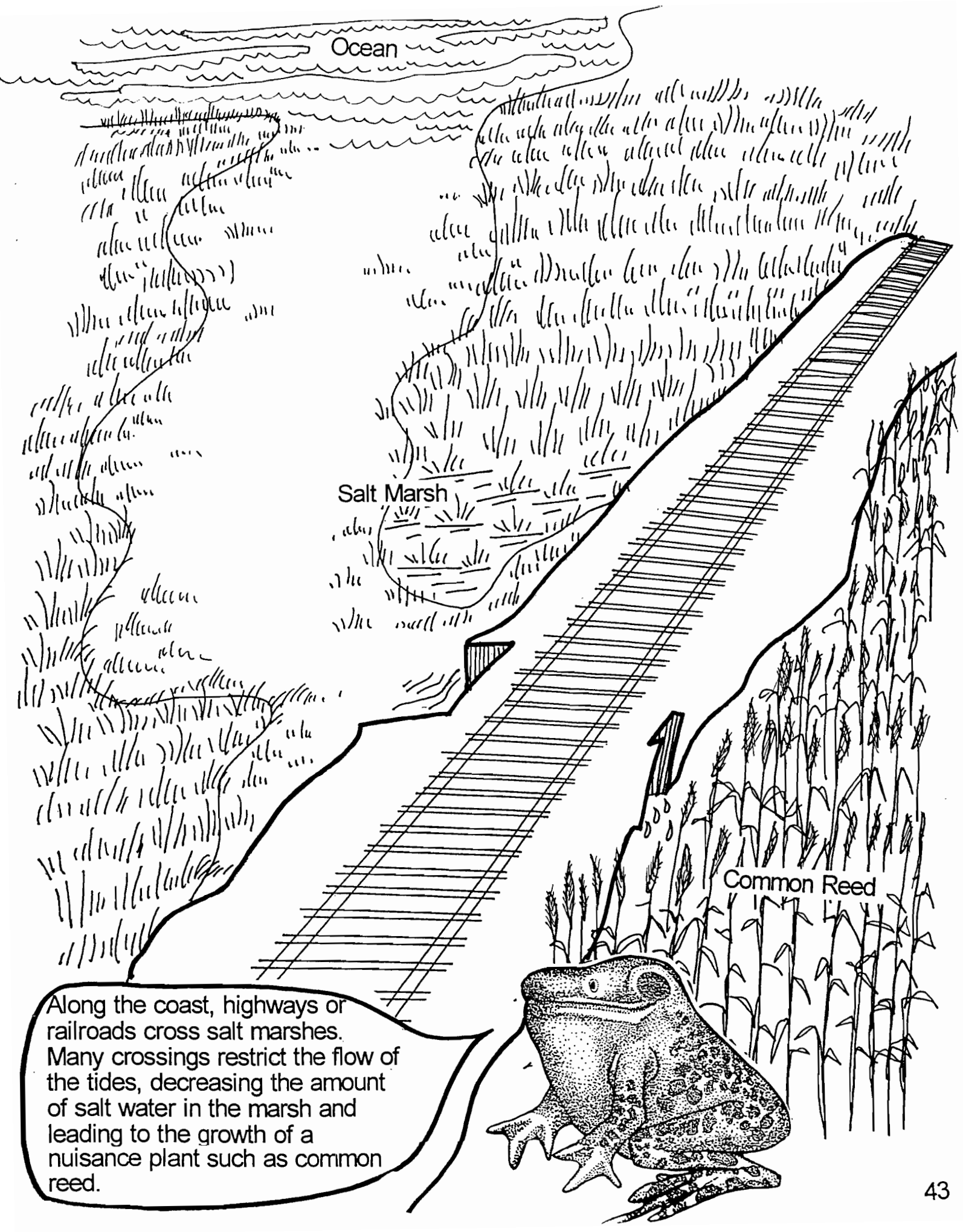

HABITAT INTENSIVE CARE
NO SMOKING
WETLAND Restorative Cure
Because wetlands ARE important, and because many have been lost, the government is now beginning to RESTORE wetlands.

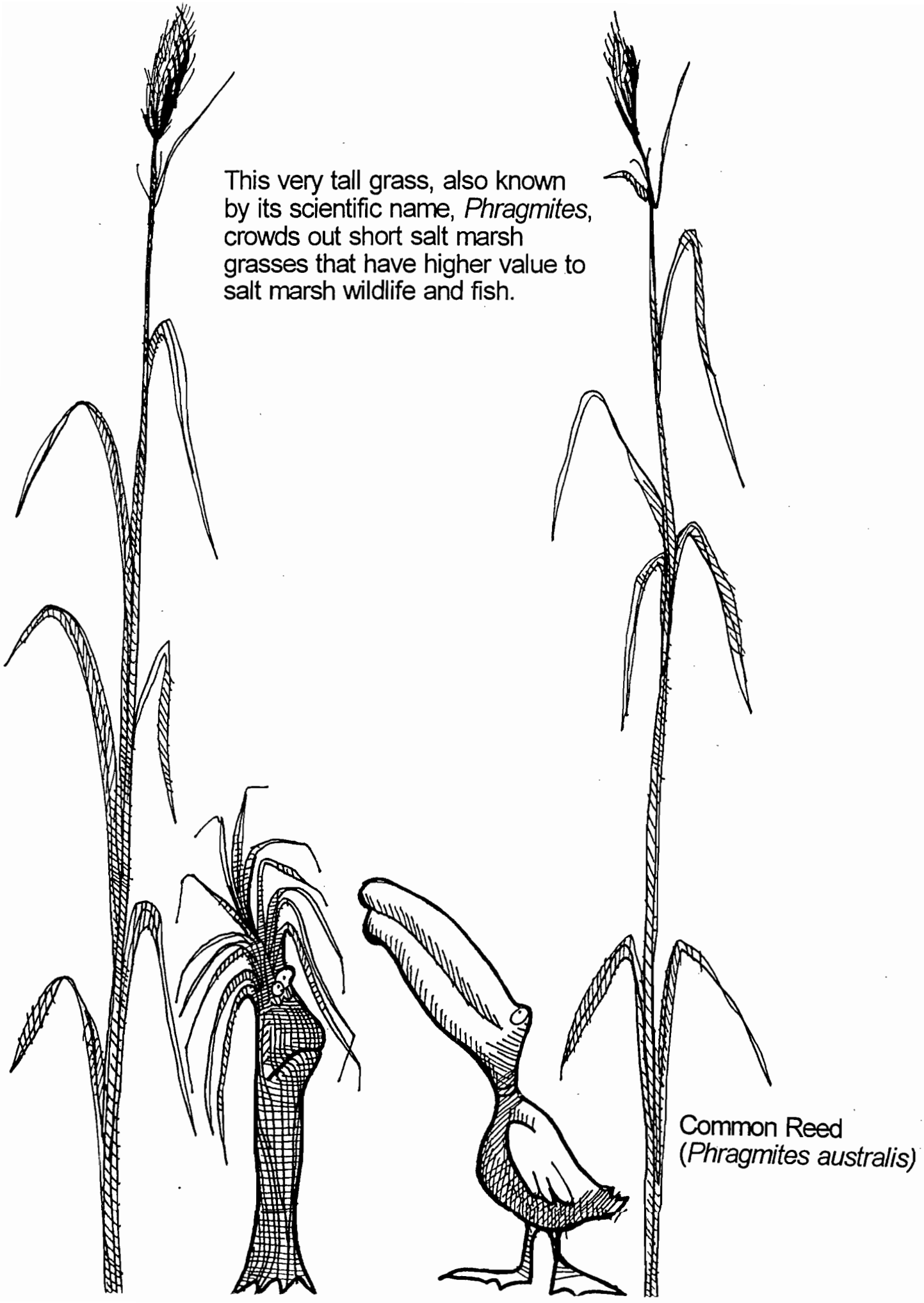

Wetlands can be restored by removing the fill placed in them or by filling in the ditches that dried them up, or...


...by improving the way a disturbed wetland works, by returning more water to the area, or by stopping a source of pollution.



Wetlands that were cleared and drained for farming but now are no longer productive farmland, make good sites for restoration. By destroying the drainage system, wetland hydrology can be restored.

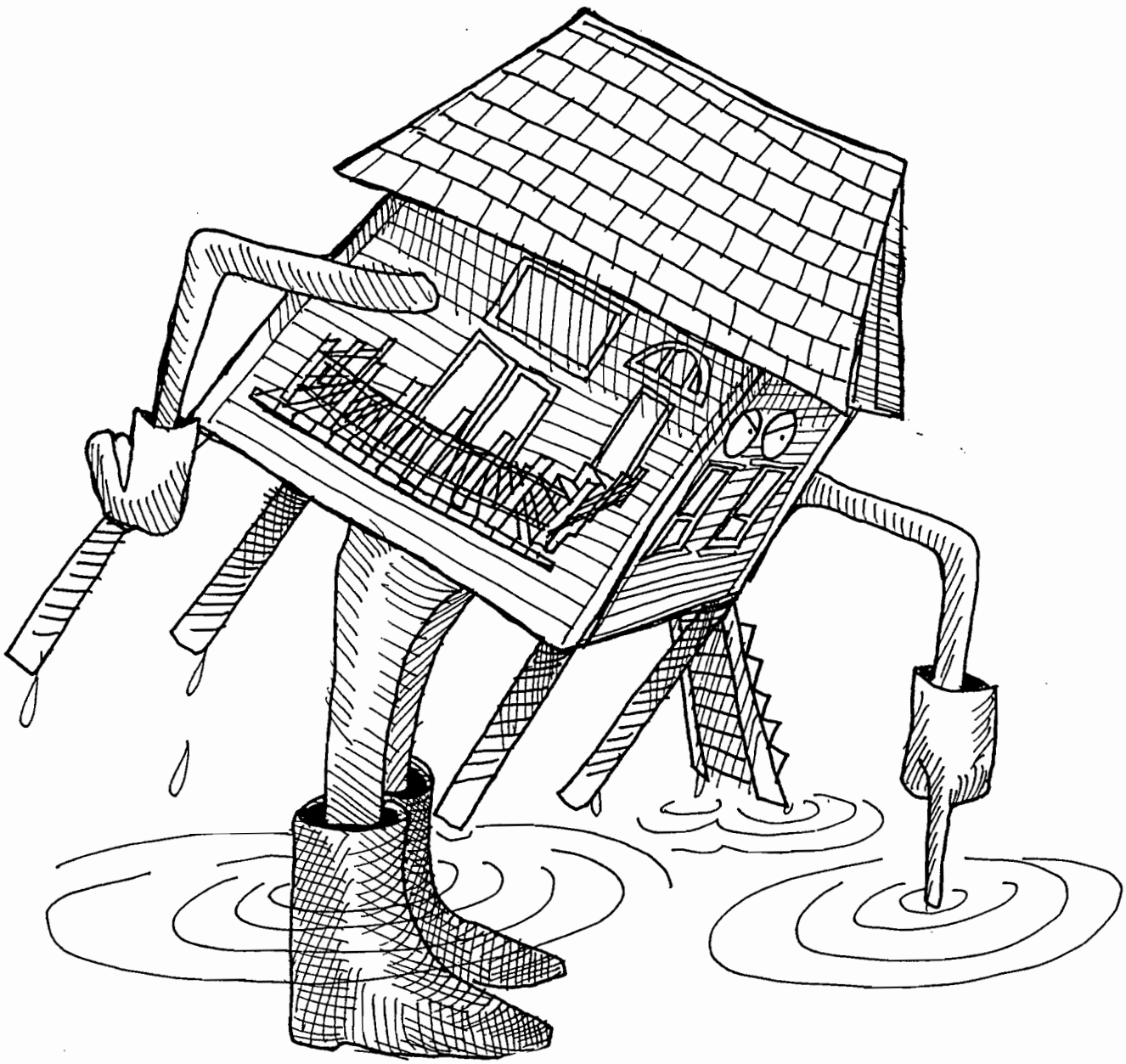

Ocean
Salt Marsh
Common Reed
Along the coast, highways or railroads cross salt marshes. Many crossings restrict the flow of the tides, decreasing the amount of salt water in the marsh and leading to the growth of a nuisance plant such as common reed.



This very tall grass, also known by its scientific name, *Phragmites*, crowds out short salt marsh grasses that have higher value to salt marsh wildlife and fish.

Common Reed
(*Phragmites australis*)

These marshes can be restored by increasing the tidal flow to the upstream side of the road or railway bed. The State of Massachusetts and the U.S. Army Corps of Engineers are working together on a project to link a marsh with nearby waters.

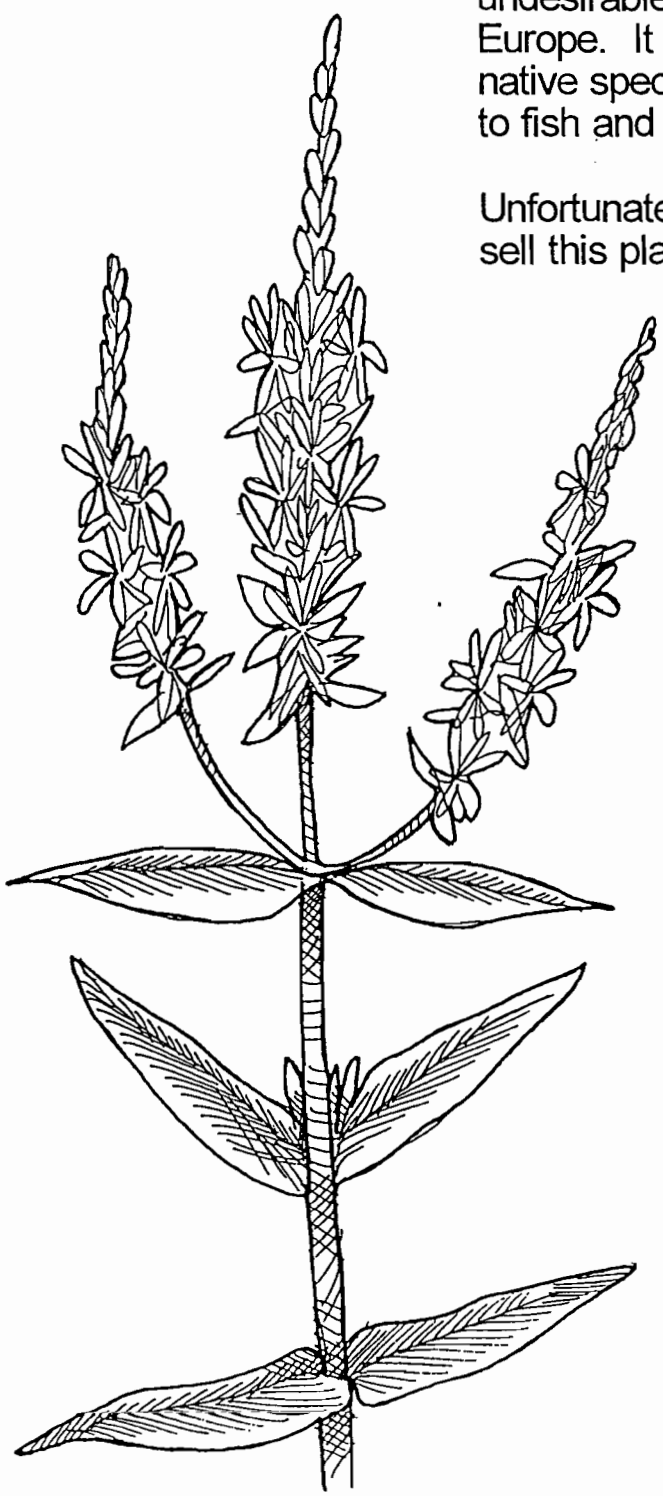


These restoration projects are only possible where flooding the marsh will not harm the neighboring homeowners.

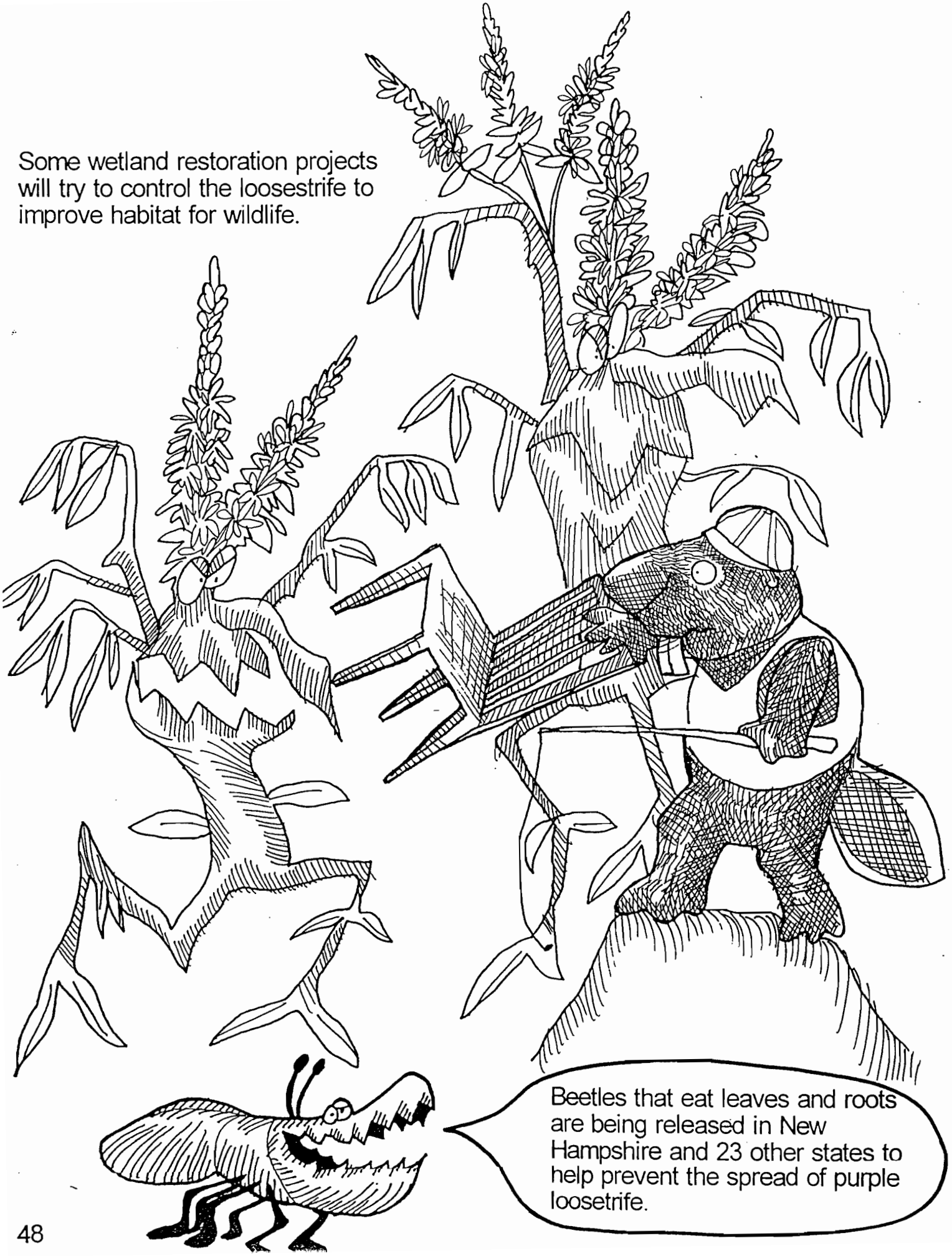
Purple loosestrife is one of the prettiest marsh plants you will see. In late summer, you can see its small purplish or pinkish flowers forming spike-like bouquets.

Despite its beauty, purple loosetrife is actually an undesirable plant introduced from Europe. It has now crowded out native species with higher value to fish and wildlife.

Unfortunately, some nurseries still sell this plant.

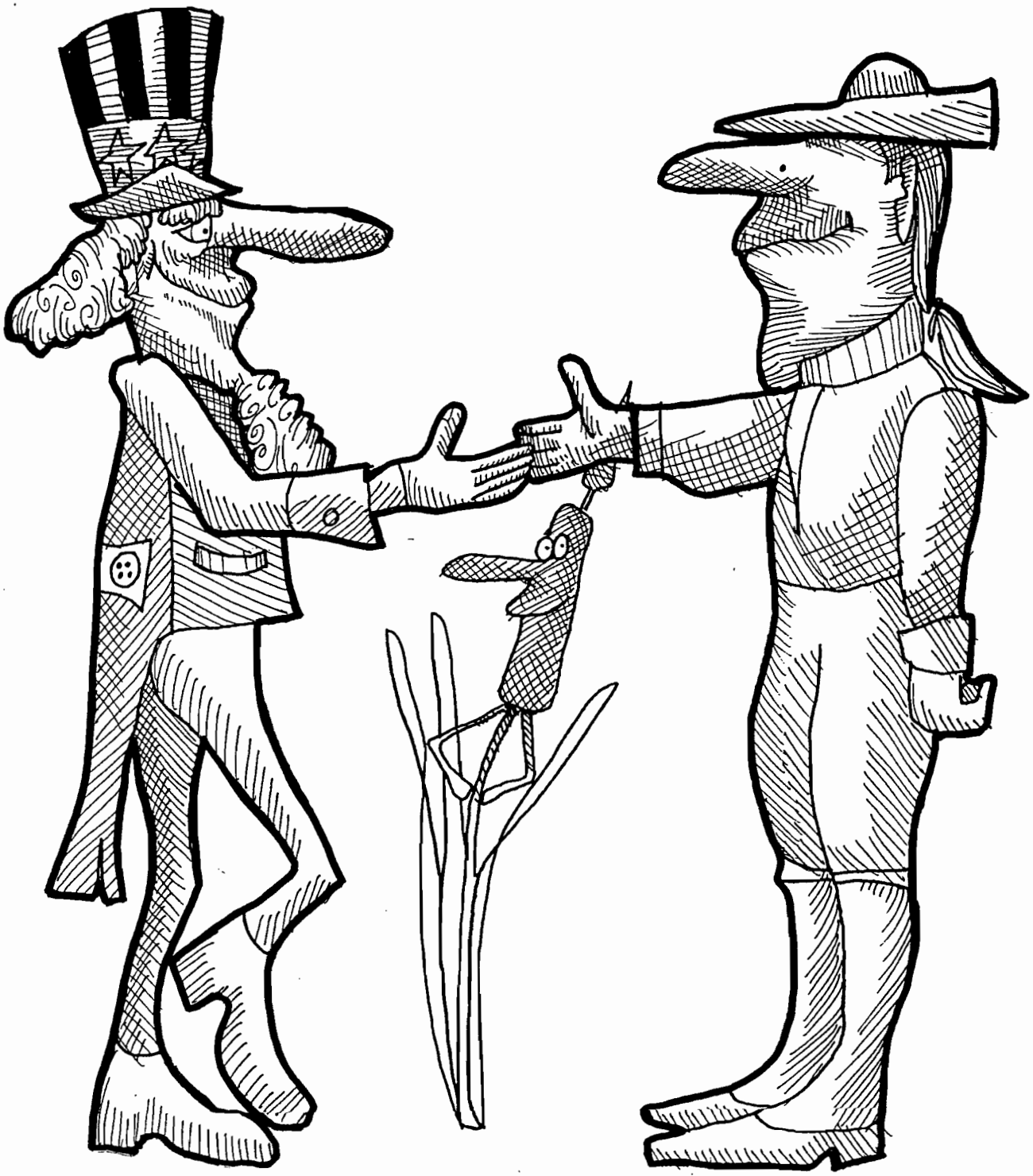


Some wetland restoration projects will try to control the loosestrife to improve habitat for wildlife.

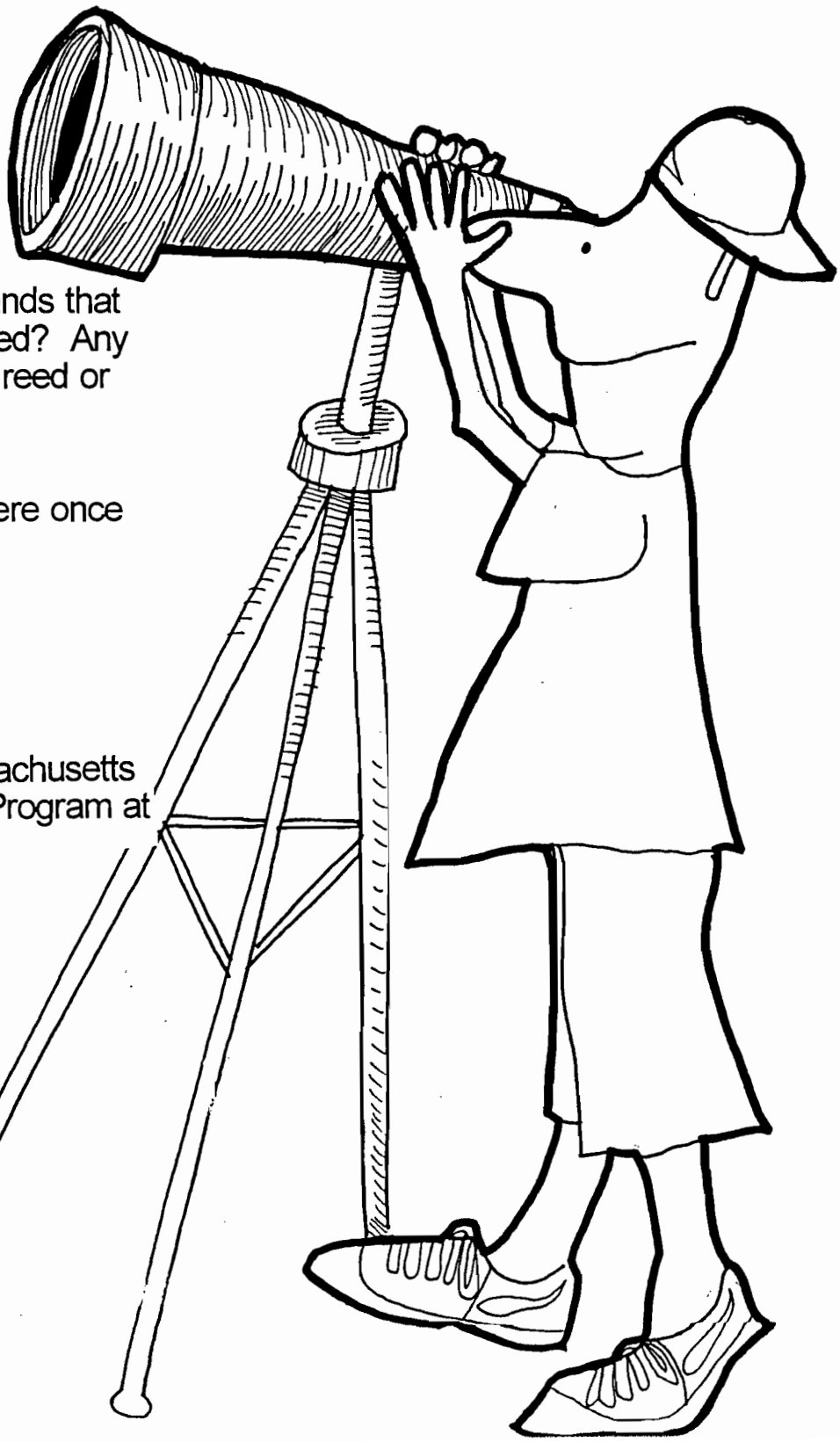


Beetles that eat leaves and roots are being released in New Hampshire and 23 other states to help prevent the spread of purple loosetrife.

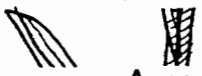
The State has created the Massachusetts Wetlands Restoration and Banking Program to help bring back lost wetlands and improve impaired functions of degraded wetlands in the State. A resolution has been signed by the State and Federal government so that they can work together towards wetlands restoration.



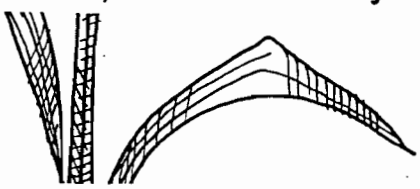
A major part of the restoration program will be to identify potential sites. Local communities can help.



Do you know any wetlands that are ditched or partly filled? Any wetlands with common reed or purple loosestrife?



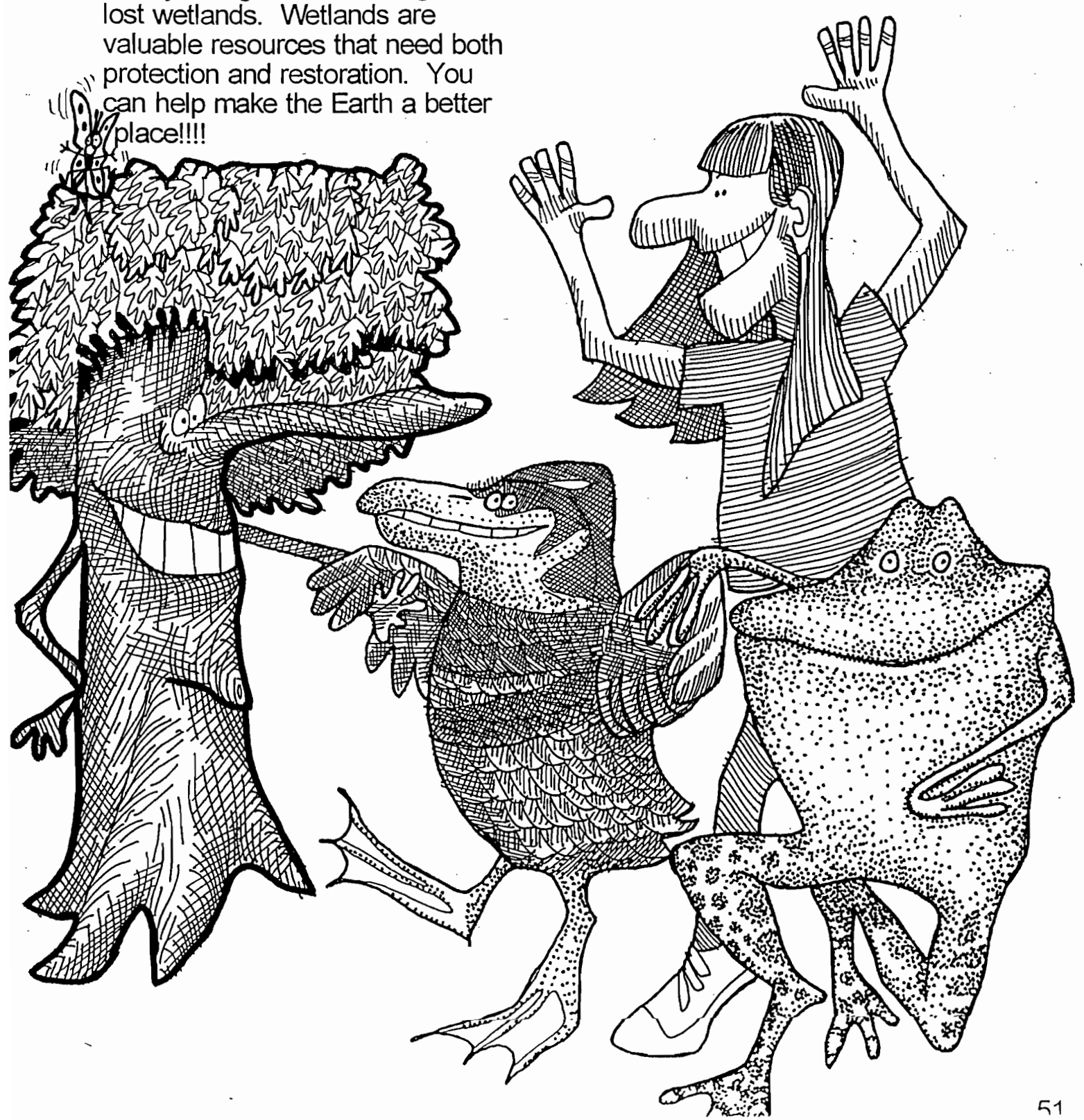
Any open areas that were once wet, but are now dry?



If so, contact the Massachusetts Wetlands Restoration Program at (617) 727-9800.

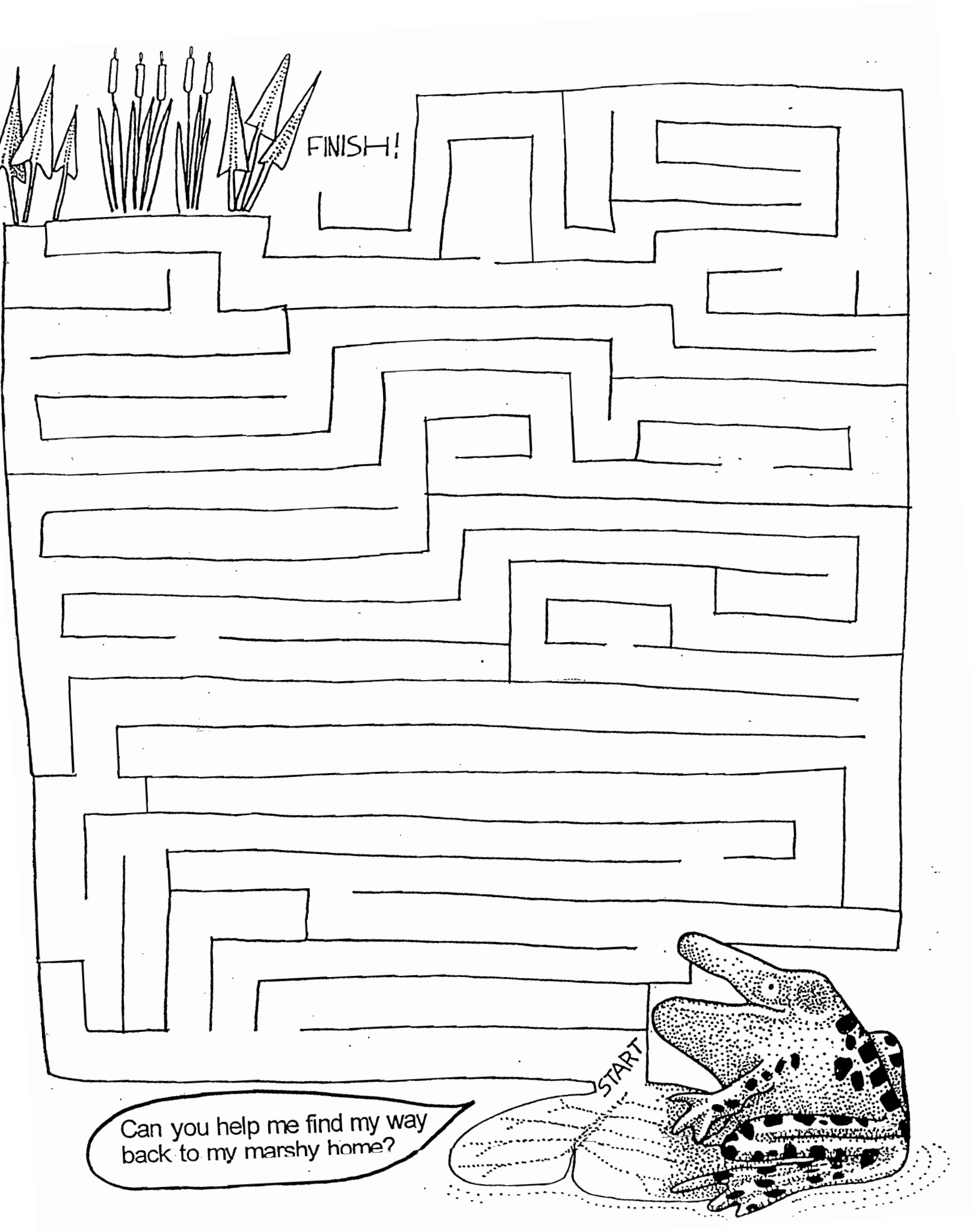
Once wetlands are restored, they can provide us with valuable services, including flood storage, shoreline protection, water quality improvement, and fish and wildlife habitat.

Let's join together and bring back lost wetlands. Wetlands are valuable resources that need both protection and restoration. You can help make the Earth a better place!!!!



Can you name these wetland plants?

(Answers on the bottom of the last page.)


FINISH!
START
Can you help me find my way back to my marshy home?

Find 2 letters that appear 10 times. Cross them out, then find:

M	U	S	K	R	A	T	S	H	G
R	E	S	T	O	R	E	C	G	H
H	S	W	A	M	P	S	E	S	H
H	C	A	C	M	E	A	D	O	W
W	E	T	L	A	N	D	H	I	A
C	B	E	A	R	H	H	C	L	T
H	C	R	C	S	F	R	O	G	E
C	H	C	C	N	E	S	T	S	R

1. Small mammal living in marshes and building houses of marsh plants.

   _ _ _ _ _ _ _ _ _

2. It's good to

   _ _ _ _ _ _ _ _ _ wetlands.

3. Wooded Wetland

   _ _ _ _ _ _

4. Large Mammal which eats blueberries and lives around bogs, swamps and other wild places.

   _ _ _ _ _

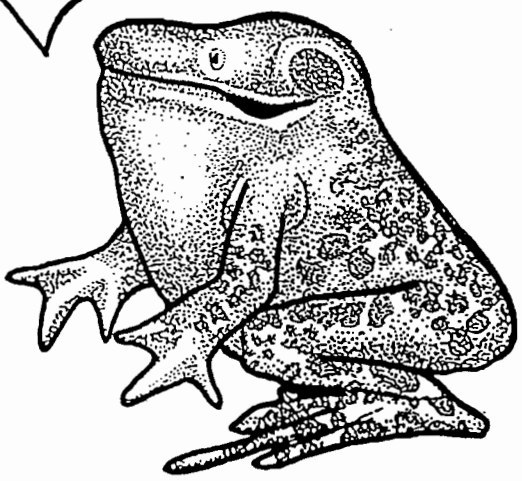
5. A wet _ _ _ _ _ _ _ _ is a wetland that is too wet to farm most years, but which may be used to produce hay, or to graze cows.

6. Area with hydric soils and hydrophytes.

   _ _ _ _ _ _ _ _ _

7. Adult tadpole

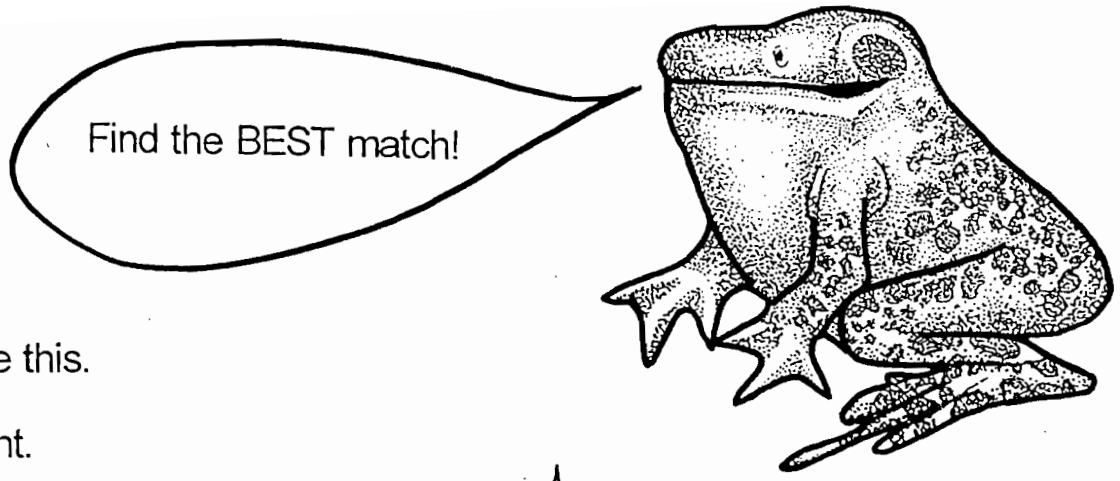
Find 2 letters that appear 10 times. Cross them out, then find:



8. Birds build _ _ _ _ _ _ in wetlands.

9. You can't have a wetland without _ _ _ _ _ _!!!

10. Fish lay these in tidal marsh nurseries._ _ _ _ s



Wetlands provide this.

Water-loving plant.

Muck.

Salt marshes provide this for fish.

Forested wetland.

Beautiful plant that is also a problem.

Tall grass which chokes out more valuable plants.

Wetland animal which modifies its own habitat.

A wetland where carnivorous plants may live.

A wetland that is flooded with ocean water by the tides.

A new method to control loosestrife, used in 24 states.

bog

salt marsh

purple loosestrife

beaver

Phragmites

beetles

hydrophyte

a nursery area

swamp

a hydric soil

wildlife habitat

answers:
bulrush
buttonbush
cattail
arrow arum
duckweed
silky dogwood
beaconset
pickerelweed
horsetail
pitcher plant
marshmallow
lizard's tail

THE END