



's

STREAM

Keepers

field notebook



Welcome ...



...to your stream! Trout Unlimited is excited to offer you the chance to really get to know your home waters. You will explore this stream as a scientist, an artist and an angler (person who fishes). Whether you come here all the time or have never been here before, we hope you learn something new.

About this handbook

This handbook is all for YOU. Some of the pages are worksheets to help you complete the activities. Other pages are blank for you to use however you want. You might fill this entire handbook with data, drawings, and observations, or you might have some blank pages. Whatever you put in here, there are no wrong answers—just record what you observe and feel.



Let's get started!

What is today like?



Fill the box with words or pictures about today: how you got here, how you're feeling, what the weather is like and anything else about today.

A large, empty rounded rectangle box with a thin black border, intended for a user to draw or write about their day.

What do you want to learn?

Fill the box with words or pictures about what you'd like to learn. STREAM stands for **S**cience, **T**echnology, **R**ecreation, **E**ngineering, **A**rts, and **M**ath. But it also means running water, like a river, creek, or stream.

S
T
R
E
A
M

Streamwalk Site Survey Data

Location

Stream name: _____

Date: _____ Time: _____

County: _____ State: _____

Stream location (park or property):

Site (description of exact location of the stretch of stream you are studying):

Weather

Current temperature: _____

Sky and precipitation (circle all that apply):

Clear *Clouds* *Overcast* *Rain*

Showers *Storm* *Wind*

What colors do you see in the sky?

Other notes on location and weather:

Stream Description

Depth (estimated average):

Width (estimated average):

Clarity – Does water appear (circle one):

Clear

Cloudy

Color—What color is the water? _____

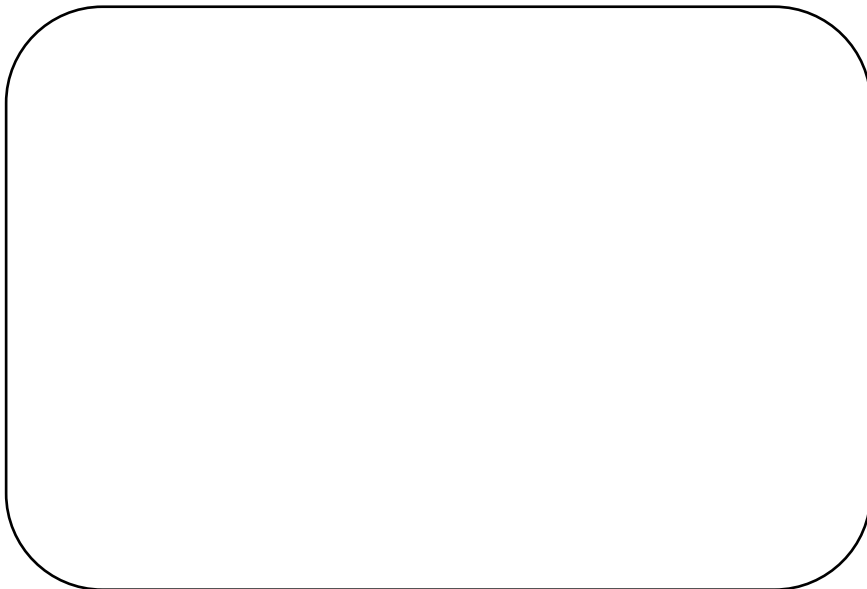
Water flow (circle all that apply):

Pools

Riffles

Runs

Draw the shape of the stream cross-section below:



Streamwalk (continued)



Does the water have a smell? If so, what?

What sounds is the stream making?

Stream Bottom (circle all that apply):

Clay/Mud

Cobbles (2-10 inches)

Sand (up to 0.1 inch)

Boulders (over 10 inches)

Gravel (0.1 – 2 inches)

Bedrock (solid)

What colors do you see...

on the stream bottom? _____

on the stream bank? _____

in the rocks? _____

in the soil? _____

Width of Riparian Zone (streamside plants)

Left looking downstream _____ ft

Right looking downstream _____ ft

Streamside Vegetation (plants)

	None	Occasional	Common
Evergreen trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deciduous trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Small trees/shrubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grasses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plants appear (circle all that apply):

natural

planted by humans

growing thickly

growing thinly

What colors do you see in the plants, in their leaves, stems, fruits, and flowers

Do any plants grow in the stream? If so, describe them.

Describe and draw one short plant you see:

Describe and draw one tall plant you see:

Do any plants hang over the stream to make it shady?
(this is called the “canopy” or sometimes “cover”)

Yes No

Extent of Overhead Canopy
(circle closest fraction):

1/4 1/2 3/4 all

Extent of Artificial Bank Protection,
which is where stream bank has been built by humans
(circle fraction):

1/4 1/2 3/4 all

Presence of Large Woody Material in Stream,
which is big tree branches or logs
(circle best word):

None Occasional Common

Presence of other Organic Material,
anything that used to be alive, like leaves or sticks
(circle best word):

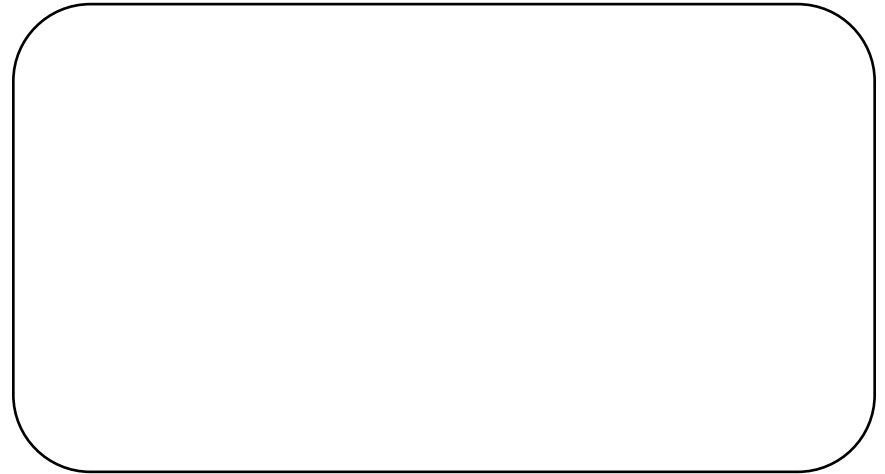
None Occasional Common

Wildlife

What animals live next to or visit the stream? How do you know? What evidence do you see, hear, smell, or feel to know this? You can write or draw.

Animal: _____

Evidence:



Animal: _____

Evidence:



Do you see fish in the stream? Yes No

What animals (fish or others) live in or spend time in the stream? How do you know? What evidence do you see, hear, or feel to know this? You can write or draw.

Animal: _____

Evidence:



Animal: _____

Evidence:



Streamwalk (continued)



Human Activity

What types of buildings are near the stream?

Is there construction near the stream? Yes No

Are there roads near the stream?

Paved *Unpaved* *No roads*

Are there livestock near the stream? Yes No

Are there farm fields near the stream? Yes No

Does the stream flow under or through anything?
If so, what?

What else is going on near the stream?
(recreation, logging, something else?)

Describe or draw the things you see near the stream:



What do the stream banks look like? (describe)

Do you see garbage or junk next to the stream? Y N

Do you see garbage or junk in the stream? Y N

Do you see mud, silt, or sand in the stream? Y N

Do you see human-built structures on the bank? Y N

Do you see human-built structures in the stream? Y N

Algae or scum? Y N

Foam or sheen? Y N

Organic waste in the stream? Y N

Livestock in the stream? Y N

Discharging pipes? Y N

Any pipes? Y N

Ditches entering the stream? Y N

For any "yes" answers above, describe what you see:

Streamwalk Follow-up



What was your overall impression of the stream?

Sketch a picture, make a list, or write a poem.



What three pieces of evidence did you find for ways that humans use this water?

What evidence did you find for ways that plants and non-human animals use this water?

Streamwalk Follow-up

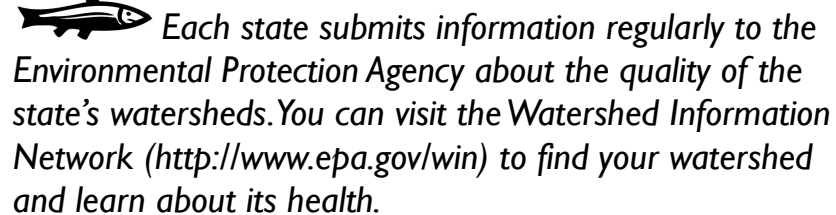
(continued)



What color was the water? Was it clear? Did it smell?

From what you observed while visiting the stream, what can you say about the quality of the water?

Do you think water quality is a problem at this site? What evidence do you have for your answer?

[illegible]

Go with the Flow! measuring, recording, calculating

Researchers names: _____

Date: _____ Time: _____

Reach Description:

Stream temperature _____ Water clarity level _____

Measuring Stream Velocity

Measure the length of time for the ball to travel 30 feet. Repeat this measurement and use the table at right to record, calculate, and average the results.

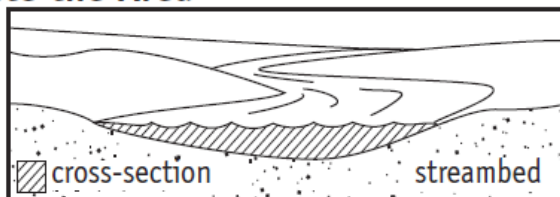
Result: _____ ft/s

(average velocity)



Velocity Work Area			
tries	distance	time	velocity
1	30 ft	\div s =	ft/s
2	30 ft	\div s =	ft/s
3	30 ft	\div s =	ft/s
4	30 ft	\div s =	ft/s
total =			ft/s
			\div 4
average velocity			ft/s

Calculate the Area



Choose a cross-section of creek in the middle of the 30-foot section of creek and calculate the cross-section area.

Result: _____ ft x _____ ft = _____ ft²
 (width) (average depth) (area)

Average Depth Work Area			
	depth	convert to feet	
1	in	÷ 12 =	ft
2	in	÷ 12 =	ft
3	in	÷ 12 =	ft
total=			ft
			÷ 3
average depth			ft

Calculate Flow

Now use your two results above to find flow! Multiply velocity times area to calculate flow.

_____ ft/s x _____ ft² = _____ cfs
 (velocity) (area) (flow)



Macroinvertebrate Collection

Location

Stream name: _____

Date: _____ Time: _____

County: _____ State: _____

Stream location (park or property):

Site (description of exact location of the stretch of stream you are studying):

Weather

Current temperature: _____

Sky and precipitation (circle all that apply):

Clear Clouds Overcast Rain
 Showers Storm Wind

Collection

Which method did you use to get macroinvertebrates?

Were macroinvertebrates present? Yes No

Macroinvertebrate Types

What kinds of macroinvertebrates did you find?

List them all here:

Macroinvertebrate Observation

Sketch a few of your favorites in the boxes below:

Type: _____

Type: _____

Type: _____

Type: _____

Macroinvertebrate Calculation

The diversity and abundance of underwater insects living in a particular stream tell us about long-term water quality. Some of these insects are only present in streams of the highest quality, while others thrive in poor quality water.

Mayflies (*Ephemeroptera*), Stoneflies (*Plecoptera*), and Caddisflies (*Trichoptera*), are often referred to as EPT, and these are the most sensitive of insect orders, living only in the cleanest streams. The abundance of a high diversity of insect orders, including EPT, usually indicates a healthy stream.

Total number of types of macroinvertebrates found:

_____ (Ideal: 13+)

Total number of kinds of EPT:

_____ (Ideal: 7+)

Overall Stream Score (add two numbers):

_____ (Ideal: 20+)

Fly Casting



What does fly casting feel like?

Did anything about it surprise you?

[illegible]

Fly Casting



Any other thoughts, notes or doodles?
Put them here.

This image shows a single sheet of white paper with rounded corners. The top half of the page is completely blank. The bottom half features ten horizontal black lines, evenly spaced, which serve as guides for handwriting practice. The lines extend across the width of the page, leaving small margins on either side.

Fly Tying



What is fly tying like? Sketch your tying set-up here.

Did anything about it surprise you?

This image shows a single sheet of white paper with rounded corners. The top half of the page is completely blank. The bottom half features ten horizontal black lines, evenly spaced, which serve as guides for writing. The lines extend across the width of the page, leaving small margins on the left and right sides.

Fly Tying



Which fly is your favorite to tie?

Sketch it here and write down your fly “recipe.”

A large rounded rectangular box for sketching a fly. The bottom portion of the box contains ten horizontal lines for writing the fly's recipe.

Reflection



Choose one color. Where are all the places you see it?

A large rounded rectangular box for reflection, intended for drawing or writing about where a chosen color is seen.

Reflection



What are all the different textures you can feel here?

A large, empty rounded rectangle with a thin black border, intended for a student's reflection.

Reflection



Sit still for at least one minute. What are new things you didn't notice before?

A large, empty rounded rectangle with a thin black border, intended for a student's reflection.

Reflection



Wander. Where did you end up? What brought you to that place?

Reflection



Where was the water before it was here? And before that? And before that? And before that ...

Reflection



Where is the water going next? And after that? And after that? And after that ...

A large, empty rounded rectangle with a thin black border, intended for writing a reflection.

Reflection



What day is it? What did you do today? How does what you did make you see this place differently?

A large, empty rounded rectangle with a thin black border, intended for writing a reflection.

Reflection



What day is it? What did you do today? How does what you did make you see this place differently?

A large, empty rounded rectangular box for writing reflections on page 35.



A series of ten horizontal lines for writing reflections on page 36.



Stream Scavenger Hunt



All the Ingredients of a Stream

Now, you and your team get to go on a scavenger hunt and find the nine different ingredients that make up a healthy stream!

The next nine pages of this workbook are where you'll write or draw your ideas and observations about each scavenger hunt item you find. There is one page for each of the nine stream ingredients.

You can go in any order but be sure to find a good example of each stream ingredient. And be sure you and your team record complete, detailed answers for each one:

1. WATER
2. RIFFLES
3. ROCKS
4. TREES
5. WOOD
6. SHORT PLANTS
7. SKY
8. ANIMALS
9. BUGS



1. WATER



Does the water look clear, cloudy, or both? What color is the water? Why?

A large, empty rounded rectangular box with a thin black border, intended for a child to draw their observations of water.

2. RIFFLES



What's a riffle? How many do you see? What does a riffle do to the water?

A large, empty rounded rectangular box with a thin black border, intended for a child to draw their observations of riffles.

3. ROCKS



What's the stream bottom made of? What colors is it? How big are the pieces you see?

4. TREES



How many trees do you see by the stream? What kinds? What do trees do for the stream and animals?

5. WOOD



How many big pieces of wood do you see in the stream? What animals benefit from wood? How?

6. SHORT PLANTS



Are the plants by the stream growing thickly or thinly? Name or describe as many as you can.

7. SKY



What color is the sky today? What's happening? How does what's happening in the sky affect the stream?

A large, empty rounded rectangle with a black outline, intended for a student to draw or write their response to the questions above.

8. ANIMALS



What animals (bugs and non-bugs) live NEAR the stream? What evidence do you find that tells you?

A large, empty rounded rectangle with a black outline, intended for a student to draw or write their response to the questions above.

9. BUGS



How many kinds of bugs do you see that live IN the stream? What kinds are they?

**S
T
R
E
A
M**





Further Activities



In the Community

Decide on a community action you can take to help your local streams. You may decide to do a stream clean-up, put on a water festival, go to town hall to advocate for a change, or think of something else entirely!

Further Exploration

Several organizations offer additional opportunities to learn about watersheds. Spend time exploring what might be available in your area to further your knowledge



Further Activities



Taking Lessons Home

On the following pages you will find a checklist from the U.S. Environmental Protection Agency (EPA). Your goal is to answer the checklist as honestly as possible and then strive to convert at least three “no” answers into “yes” answers.



Projects and Activities



Home and Lawn Care Checklist: “Personal Pollution”

When rain falls or snow melts, the seemingly small amounts of chemicals and other pollutants in your driveway, on your lawn, and on your street are washed into storm drains. In many older cities, the storm water runoff is not treated and runoff flows directly into rivers, streams, bays, and lakes. Pollutants in this runoff can poison fish and other aquatic animals and make water unsafe for drinking and swimming.

What can you do to help protect surface waters and groundwaters? Start at home. Take a close look at practices around your house that might contribute to polluted runoff. The following is a checklist to help you and your family become part of the solution instead of part of the problem!

Household Products

1. Do you properly dispose of household hazardous waste such as leftover oil-based paint, excess pesticides, nail polish remover, and varnish by taking them to your city's or county's hazardous waste disposal site or by putting them out on hazardous waste collection days? Labels such as WARNING, CAUTION, and DANGER indicate the item contains ingredients that are hazardous if improperly used or disposed of.
☐ Yes ☐ No
2. Do you use less toxic alternatives or nontoxic substitutes? Baking soda, distilled white vinegar, and ammonia are safe alternatives to caustic chemicals. And they save you money.
☐ Yes ☐ No

Do-It-Yourself Home Cleaning Products

General, multipurpose cleaner (for ceramic tiles, linoleum, porcelain, etc.): Measure 1/4 cup baking soda, 1/2 cup white vinegar, and 1 cup ammonia into a container. Add to a gallon of warm water and stir until baking soda dissolves.

Window Cleaner: 3 tablespoons of ammonia, 1 tablespoon of white vinegar and 3/4 cup of water. Put into a spray bottle.

Visit <http://www.epa.gov/grtlakes/seahome/housewaste/src/recipes.htm> for more ideas on nontoxic alternatives!

3. Do you limit the amount of chemicals, fertilizers, and pesticides you use and apply them only as directed on the label?
☐ Yes ☐ No
4. Do you recycle used oil, antifreeze, and car batteries by taking them to service stations and other recycling centers?
☐ Yes ☐ No

Landscaping and Gardening

5. Do you select plants with low requirements for water, fertilizers, and pesticides? (e.g., native plants)
☐ Yes ☐ No



Notes:

6. Do you preserve existing trees and plant trees and shrubs to help prevent erosion and promote infiltration of water into the soil?

☐ Yes ☐ No

7. Do you leave lawn clippings on your lawn so that the nutrients in the clippings are recycled, less fertilizer is needed, and less yard waste goes to landfills? If your community does not compost lawn trimmings, they usually go to landfills.

☐ Yes ☐ No

8. Do you prevent trash, lawn clippings, leaves, and automobile fluids from entering storm drains? Most storm drains are directly connected to our streams, lakes, and bays.

☐ Yes ☐ No

9. If your family uses a professional lawn care service, do you select a company that employs trained technicians and minimizes the use of fertilizers and pesticides?

☐ Yes ☐ No

10. Do you have a compost bin or pile? Do you use compost and mulch (such as grass clippings or leaves) to reduce your need for fertilizers and pesticides? Compost is a valuable soil conditioner that gradually releases nutrients to your lawn and garden. In addition, compost retains moisture in the soil and thus helps conserve water and prevent erosion and runoff. Information about composting is

available from your county extension agent (see the blue pages in your phone book).

☐ Yes ☐ No

11. Do you test your soil before fertilizing your lawn or garden? Overfertilization is a common problem, and the excess can leach into groundwater and contaminate rivers or lakes.

☐ Yes ☐ No

12. Do you avoid applying pesticides or fertilizers before or during rain? If they run off into the water, they will kill fish and other aquatic organisms.

☐ Yes ☐ No

Water Conservation

Homeowners can significantly reduce the volume of wastewater discharged to home septic systems and sewage treatment plants by conserving water. If you have a septic system, you can help prevent your system from overloading and polluting ground and surface waters by ensuring that it is functioning properly and decreasing your water usage. For other ideas on what you can do to conserve water, check out a new Web site, <http://www.h2ouse>, developed in partnership with the California Urban Water Conservation Council.

13. Do you use low-flow faucets and shower heads, and reduced-flow toilet flushing equipment?

☐ Yes ☐ No

14. When washing your family's car, do you use a bucket instead of a hose to save water?

☐ Yes ☐ No

15. Do you use dishwashers and clothes washers only when fully loaded?

☐ Yes ☐ No

Did You Know?

One quart of oil can contaminate up to 2 million gallons of drinking water!



Notes:

Give Water A Hand

What is your city, town, or school doing to prevent polluted runoff? **GIVE WATER A HAND ACTION GUIDE** contains checklists for schools, communities, and farms. This guide can help you and your school identify potential problems in your community and take action.



You can download a free copy of **Give Water A Hand Action Guide and Leader Guidebook** at <http://www.uwex.edu/erc/gwah>. Or to order printed copies call:

University of Wisconsin-Extension
608-262-3346
Items 4-H460 & 4-H855
Leader Guidebook (\$4.92)
Action Guide (\$6.96)
Price includes shipping.

16. Do you take short showers instead of baths and avoid letting faucets run unnecessarily (e.g., when brushing teeth)?

☐ Yes ☐ No

17. Do you promptly repair leaking faucets, toilets, and pumps to conserve water?

☐ Yes ☐ No

18. Do you conserve the amount of water you use on your lawn and water only in the morning and evening to reduce evaporation? Overwatering may increase leaching of fertilizers to groundwater.

☐ Yes ☐ No

19. Do you use slow watering techniques such as trickle irrigation or soaker hoses? These devices reduce runoff and are 20 percent more efficient than sprinklers.

☐ Yes ☐ No

In Your Community

20. Do you always pick up after your pet (e.g., Rover's poop)? Be sure to put it in the trash, flush it down the toilet, or bury it at least 5 inches deep. Pet waste contains viruses and bacteria that can contaminate surface and groundwater.

☐ Yes ☐ No

21. Have you helped stencil stormdrains to alert people that they drain directly to your local waterbody? If not, get involved with a local conservation group or organize your own stenciling project.

☐ Yes ☐ No

22. Do you ride or drive only when necessary? Try to walk instead. Cars and trucks emit tremendous amounts of airborne pollutants, which increase acid rain. They also deposit toxic metals and petroleum by-products.

☐ Yes ☐ No

23. Do you participate in local planning and zoning decisions in your community? If not, get involved! These decisions shape the course of development and the future quality of your watershed.

☐ Yes ☐ No



Notes:

