

PLAY



Fall
2021

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Rivers Run Through Pennsylvania

If you ever stood along the shores of a large river, you were probably in awe of its large size and the amount of water it carries. Rivers have a beginning. Inland streams carry water from the land. Streams flow into larger streams, and larger streams unite to form rivers. Rivers eventually flow into lakes, bays, estuaries, or oceans.

From a bird's-eye view, a

river system looks like a tree. The streams are like branches. The river is like the trunk.

Continue reading to learn more about the ecology of rivers, threats, and how you can help.



Vocabulary (Watch for these words!)

- **Abiotic** - nonliving parts of an ecosystem
- **Biotic** - living parts of an ecosystem
- **Carrion** - dead and decaying animals
- **Detritivores** - animals that eat detritus and carrion
- **Detritus** - dead and decaying plants and woody debris
- **Emergent vegetation** - plants that grow on the edges of a river, roots are submerged while the stem and leaves grow out of the water
- **Food web** - all the interacting food chains within an ecological community
- **Primary consumers** - animals that eat plants
- **Producers** - plants that animals eat
- **Secondary consumers** - animals that eat plant-eating animals
- **Submerged vegetation** - aquatic vegetation that lives attached to the bottom of a river and is completely underwater
- **Tertiary consumers** - top level predators

All About Rivers

Abiotic Parts of Rivers

Abiotic is a nonliving part of an ecosystem that shapes its environment.

Abiotic parts of rivers include temperature, light, and water.

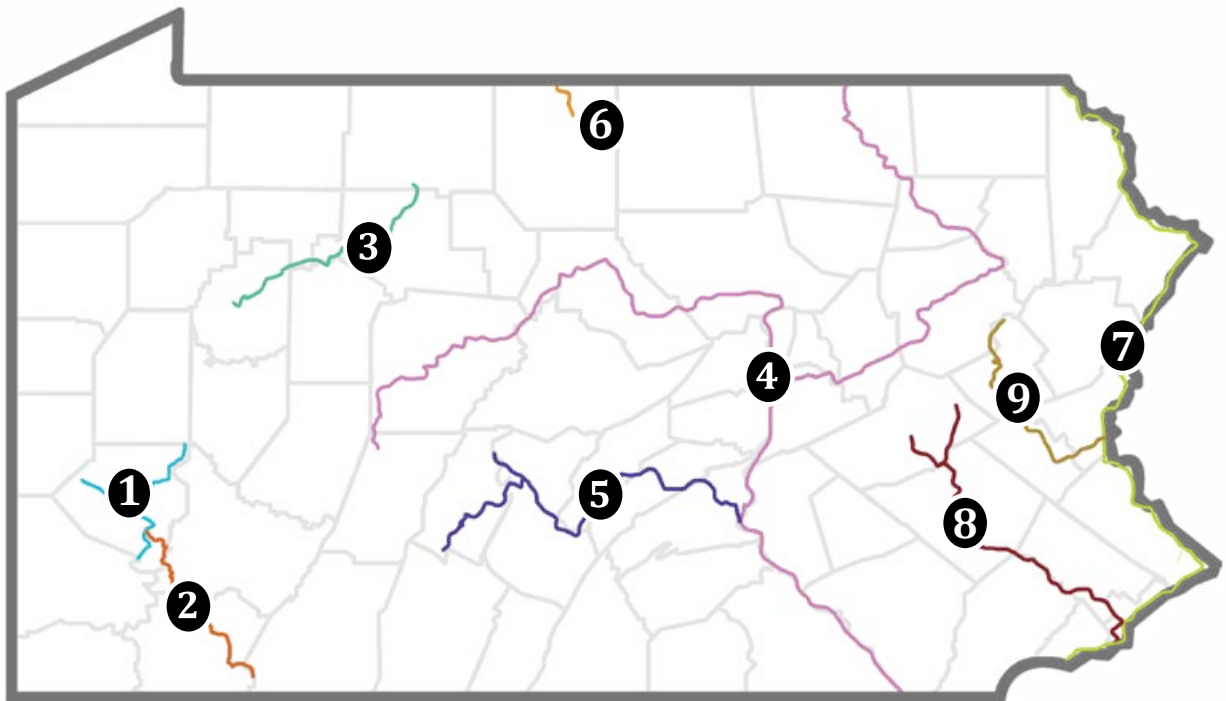
Rivers come in all shapes and sizes. Some rivers are small and flow fast. Other rivers are large and flow slowly. Smaller tributaries feed rivers. The lower reaches

of these rivers are often wider, deeper, and warmer than upstream tributaries.

As rivers flow downstream, riffles, rapids, runs, and pools are formed. Riffles and rapids are locations where rocks break the surface water. Runs are deep, fast-moving water. Pools are deep, slow-moving water below the runs.

Major Rivers of Pennsylvania

- | | | |
|---|---|--------------------|
| ❶ Three Rivers (Allegheny River, Monongahela River, and Ohio River) | ❹ Susquehanna River (including West Branch Susquehanna River) | ❷ Delaware River |
| ❷ Youghiogheny River | ❺ Juniata River | ❸ Schuylkill River |
| ❸ Clarion River | ❻ Genesee River | ❹ Lehigh River |



Learn more about how waterways change from source to end: www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/AquaticHabitat/Documents/riverruns.pdf.

River Habitats

There are many different types of habitats that are found in a river system, which provide the food and environment

needed by aquatic plants and animals. Below are some different types of habitats found in a river system.



- ① Gravel, cobbles, boulders, and rocky ledges
- ② Islands
- ③ Silty or sandy river bottoms
- ④ Log and debris jams
- ⑤ Undercut banks
- ⑥ **Emergent vegetation**
- ⑦ **Submerged vegetation**



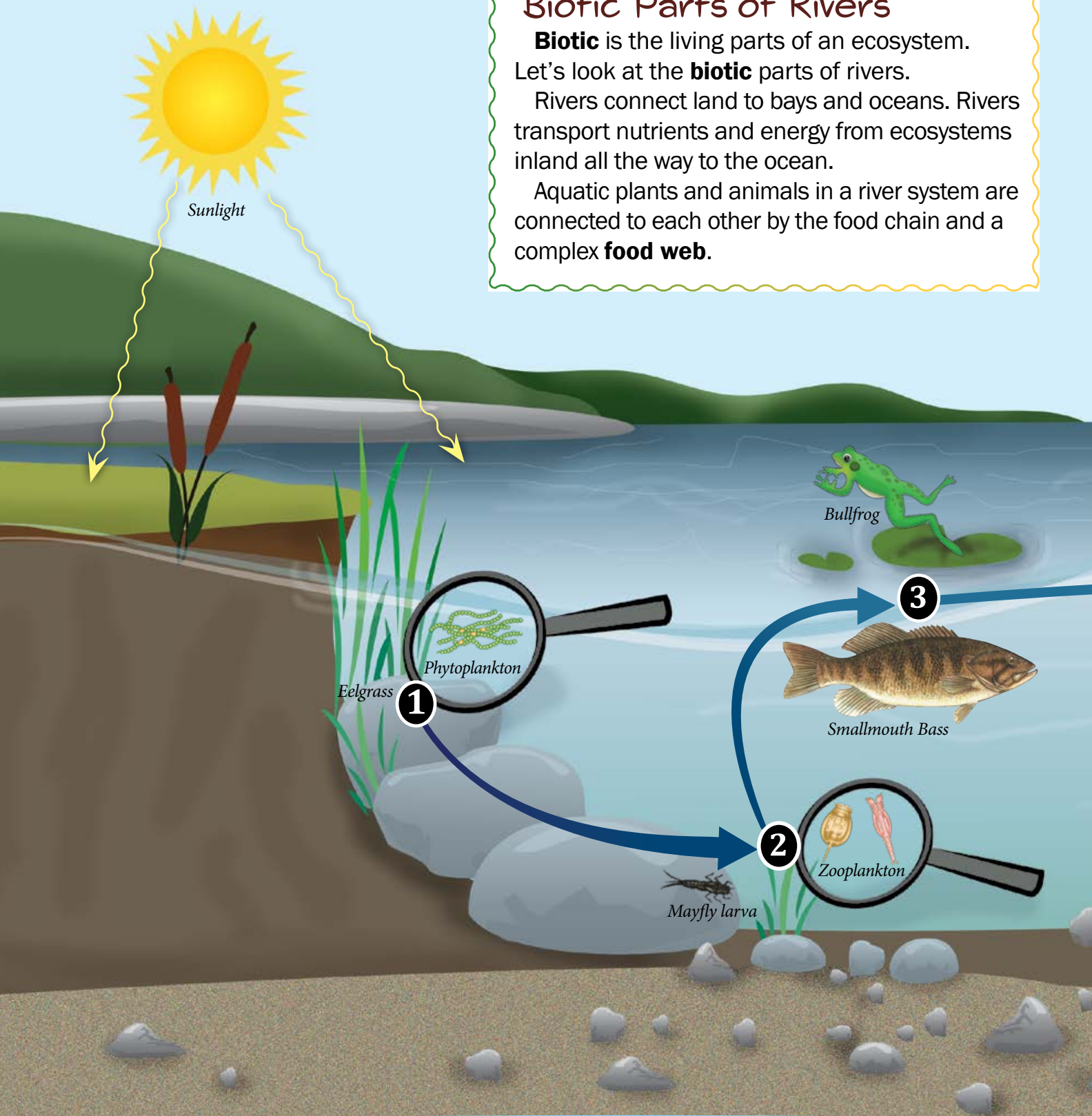
River Food Web

Biotic Parts of Rivers

Biotic is the living parts of an ecosystem. Let's look at the **biotic** parts of rivers.

Rivers connect land to bays and oceans. Rivers transport nutrients and energy from ecosystems inland all the way to the ocean.

Aquatic plants and animals in a river system are connected to each other by the food chain and a complex **food web**.



④ Tertiary consumers

Tertiary consumers are top level predators such as Muskellunge and great blue herons.

③ Secondary consumers

Secondary consumers are animals that eat plant-eating animals. **Examples of secondary consumers** are bullfrogs and Smallmouth Bass.

② Primary consumers

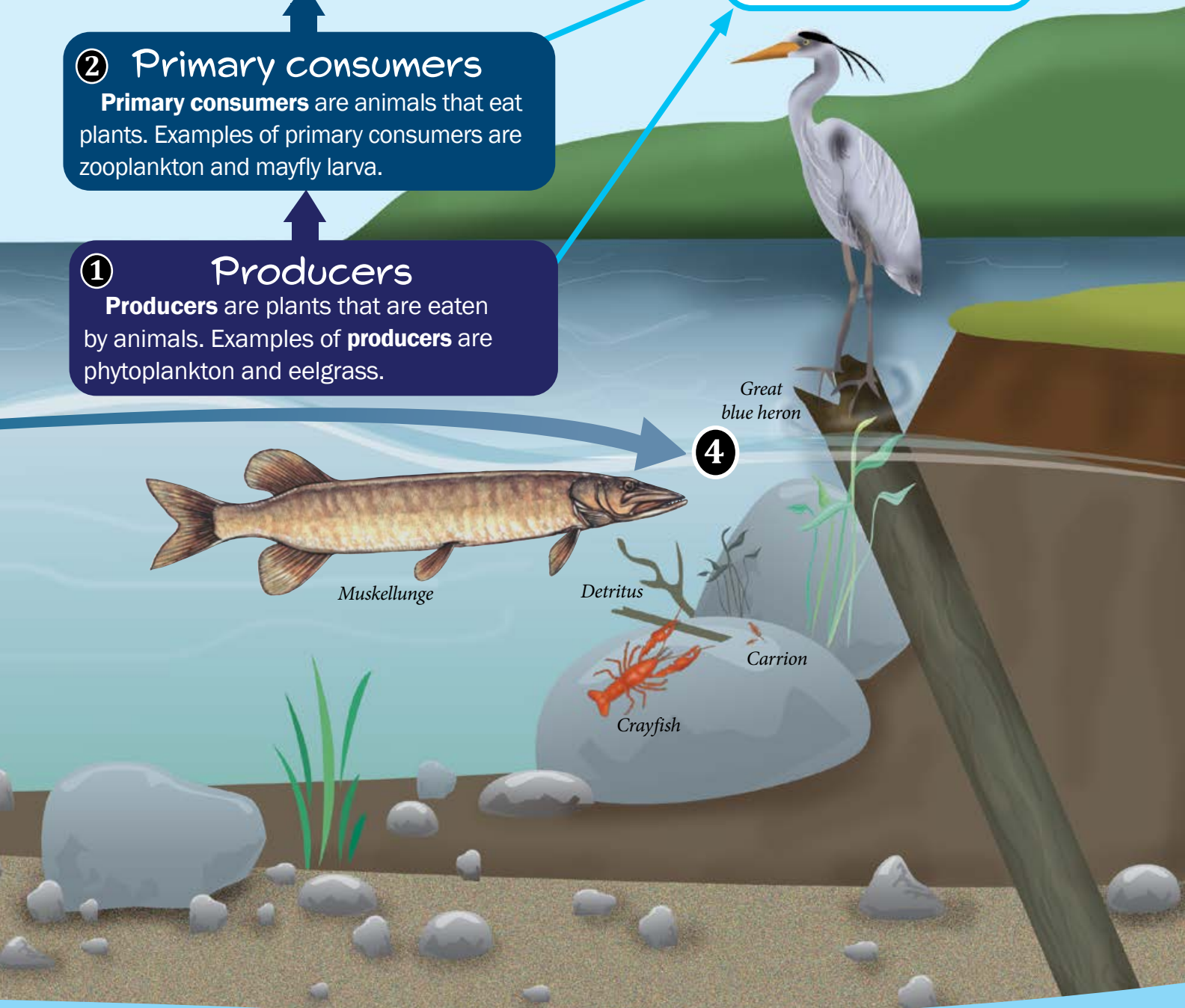
Primary consumers are animals that eat plants. Examples of primary consumers are zooplankton and mayfly larva.

① Producers

Producers are plants that are eaten by animals. Examples of **producers** are phytoplankton and eelgrass.

Detritivores

Detritivores are animals that eat dead and decaying plants and woody debris called **detritus**. **Detritivores** also eat **carrion**, which is dead and decaying animals. Examples of **detritivores** are crayfish.



Rivers of Life

Benefits to Healthy Rivers

- Drinking water
- Irrigation
- Fish and wildlife habitat
- Recreation like fishing and boating
- Transportation
- Floodwater transport
- Hydroelectricity
- Nutrient transport to estuaries



Threats to Rivers

- Invasive species - outcompete native river species
- Climate change - temperature changes and large weather events cause flooding
- Litter - garbage from roadways and urban areas
- Nonpoint source pollution - pesticides, herbicides, sedimentation, and acid mine drainage that run off from abandoned mines, developed areas, and farms
- Point source pollution - chemicals and pollution from factories, refineries, and transportation accidents
- Shoreline erosion - soil that erodes from river shorelines during high water events
- Channelization - collects or consolidates and moves water during high water events, causing damage to downstream areas



Round gobies are an Aquatic Invasive Species (AIS).

A Helping Hand for River Conservation

Join or become involved with one of these organizations:

- Chesapeake Bay Foundation **www.cbf.org**
- Pennsylvania Organization for Watersheds and Rivers **www.pawatersheds.org**
- Keep Pennsylvania Beautiful **www.keeppabeautiful.org**
- Various Riverkeepers networks such as **www.lowerusquehannariverkeeper.org**
- Pennsylvania BASS Nation **www.pabassnation.com**
- Muskies Inc. **www.muskiesinc.org**

Pennsylvania Rivers Word Search

Find these river-related words in the following word search.

D	A	O	R	Q	K	C	R	L	G	G	K	N	R	N
N	O	I	T	A	Z	I	L	E	N	N	A	H	C	O
W	D	L	K	H	T	N	R	A	V	B	F	J	Q	I
Q	A	G	K	L	R	O	F	H	R	I	M	L	B	R
U	N	T	V	Q	V	Z	N	W	R	I	R	F	A	R
X	N	S	M	I	J	H	C	E	S	K	O	A	L	A
X	A	N	R	A	X	P	A	V	E	J	L	N	L	C
A	H	F	D	E	T	R	I	T	U	S	D	Y	E	G
I	E	W	G	A	U	J	A	N	L	E	E	G	G	C
F	U	P	W	P	F	T	I	N	L	R	C	N	H	Y
Y	Q	C	A	T	A	X	Z	A	O	C	T	S	E	R
Y	S	U	U	I	H	O	W	A	M	T	Q	C	N	G
R	U	P	N	O	O	A	B	B	R	M	U	F	Y	F
U	S	U	O	L	R	D	P	W	T	W	L	V	K	T
Y	J	I	K	E	L	L	I	K	L	Y	U	H	C	S

Word List

ALLEGHENY
CARRION
CHANNELIZATION
CLARION
DELAWARE
DETRITUS
GENESEE
JUNIATA
RIVER
SCHUYLKILL
SUSQUEHANNA

(Hint: Some words may appear backwards.)

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Answer Key