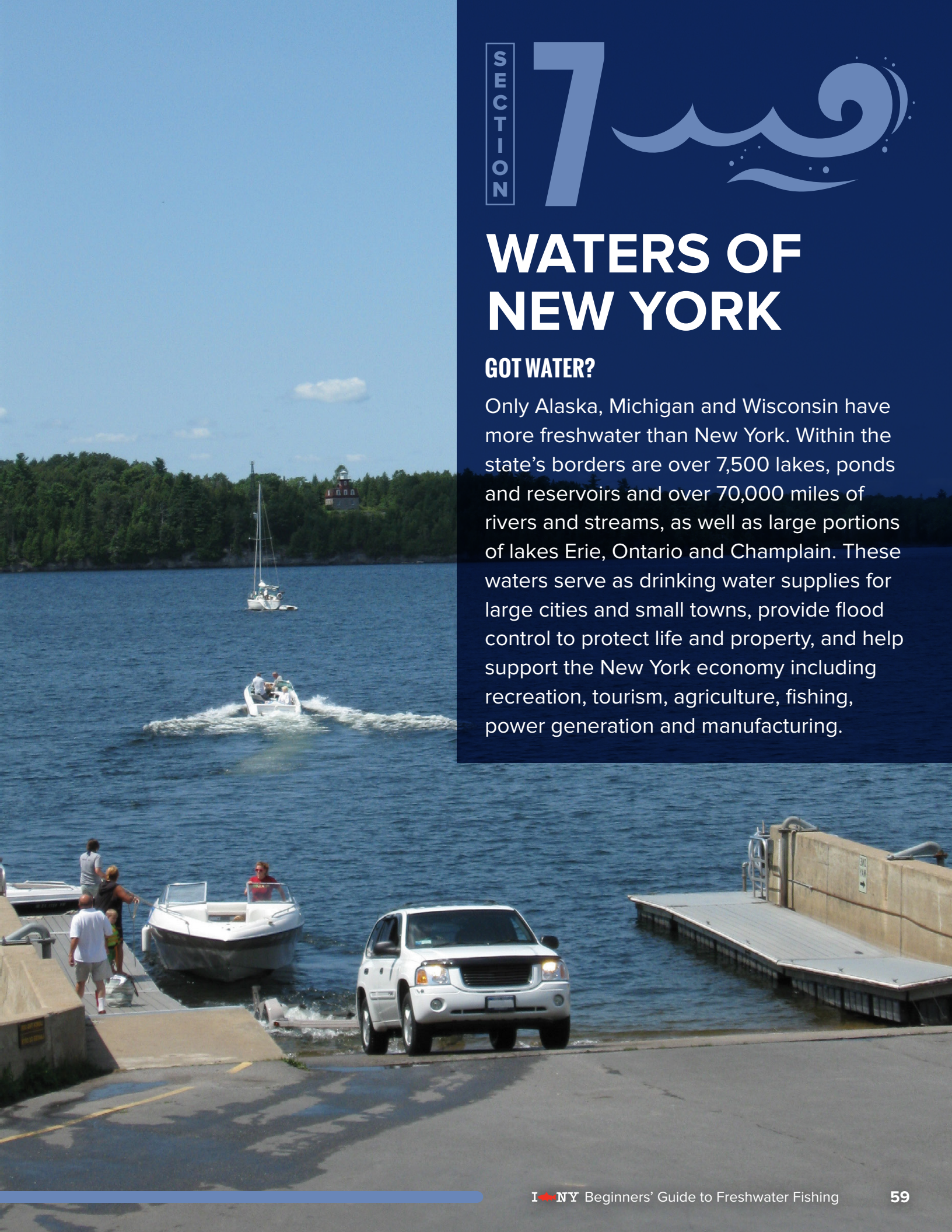


SECTION 7

WATERS OF NEW YORK

GOT WATER?

Only Alaska, Michigan and Wisconsin have more freshwater than New York. Within the state's borders are over 7,500 lakes, ponds and reservoirs and over 70,000 miles of rivers and streams, as well as large portions of lakes Erie, Ontario and Champlain. These waters serve as drinking water supplies for large cities and small towns, provide flood control to protect life and property, and help support the New York economy including recreation, tourism, agriculture, fishing, power generation and manufacturing.

Oneida Lake is the largest lake completely in New York covering 51,243 acres. Our second largest lake, Seneca Lake is also our deepest with a maximum depth of 618 feet. Seneca is part of a system of 11 glacially created waters known as the Finger Lakes located in Central New York. Cayuga, Otisco, Skaneateles, Owasco, Keuka, Canandaigua, Honeoye, Canadice, Hemlock and Conesus make up the other 10 Finger Lakes.

In southeastern New York, the 18 reservoirs built to supply New York City with drinking water make up the bulk of the freshwater resource in the region. Ashokan Reservoir is the largest at 8,060 acres.

New York's Adirondack Park takes up most of the northeastern section of the state and it contains over 3,000 lakes and ponds. Largest among these are Lake George at 28,523 acres and Great Sacandaga Lake at 24,707 acres. In the western part of the state, Chautauqua Lake is the largest freshwater lake at 13,126 acres.

MORE THAN ONE RIVER RUNS THROUGH IT

New York has over 59,300 rivers and streams within its borders. Some of these streams are intermittent, only flowing during wet periods. The Hudson River, which flows 301 miles from Lake Tear of the Clouds in the Adirondacks to New York Harbor, is the longest river completely in New York State. It is also the deepest, reaching depths of over 200 feet in spots. The St. Lawrence, which flows 744 miles from Lake Ontario to the Gulf of St. Lawrence in the Province of Quebec, is the longest river starting in New York.

Hudson River

NEW YORK'S LARGEST LAKES

Name	Acres	Watershed
1. Oneida Lake	51,243	Oswego
2. Seneca Lake	43,393	Oswego
3. Cayuga Lake	42,573	Oswego
4. Lake George	28,479	Champlain
5. Great Sacandaga Lake	24,707	Upper Hudson
6. Chautauqua Lake	13,126	Allegheny
7. Keuka Lake	11,654	Oswego
8. Canandaigua Lake	10,633	Oswego
9. Skaneateles Lake	8,746	Oswego
10. Ashokan Reservoir	8,060	Lower Hudson

Only includes waters solely within the borders of New York State.

NEW YORK'S LONGEST RIVERS

Name	Miles	Watershed
1. Hudson River	301	Upper/Lower Hudson
2. Susquehanna River	153	Susquehanna
3. Mohawk River	147	Mohawk
4. Genesee River	147	Genesee
5. Raquette River	136	St. Lawrence
6. Oswegatchie River	132	St. Lawrence
7. Black River	113	Black
8. St. Lawrence River	110	St. Lawrence
9. Tonawanda Creek	102	Niagara/Erie
10. Indian River	90	St. Lawrence

Only includes mileage within the borders of New York State.

SOME LIKE IT WARM, SOME LIKE IT COLD

Lakes, ponds, rivers and streams can be classified as either warmwater or coldwater. Waters classified as coldwater usually maintain a temperature below 70 degrees and provide ideal habitat for trout, salmon and other species that prefer lower temperatures. Warmwater lakes, rivers and streams get too warm for trout and salmon, but provide great habitat for fish species such as largemouth bass and chain pickerel. Some waters are deep enough that they have both warmwater habitat at the surface and deeper coldwater habitat that provides suitable conditions for a variety of fish species.

DID YOU KNOW

Because of its deep waters in excess of 200 ft. and consistent deep water temperatures, Seneca Lake is the site of a U.S. Navy submarine testing facility.

HOW IT ALL BEGAN

Over 20,000 years ago, the climate cooled dramatically during the Great Ice Age and much of New York was covered by a layer of ice about one-mile thick. When the earth warmed again about 12,000 years ago, these thick layers of ice, or glaciers, began to melt. As the glaciers moved back and forth over the land, they carved out huge holes and dragged soil and rocks with them, damming river valleys. The valleys and holes filled with water forming the waters we know today, including the Great Lakes and Finger Lakes. The melt water from these glaciers also formed channels that later became our major rivers. Other waters were created by huge chunks of ice that broke off when the glaciers melted, forming what are called kettle ponds. This process is the reason why northern states that were covered with ice during the Ice Age, such as Minnesota, Wisconsin and New York, have so many natural lakes in comparison to more southern states.

Glaciers covered much of NY about 20,000 years ago.

DID YOU KNOW

Prior to the retreat of the glaciers, the Lake Champlain basin was once covered with saltwater and called the Champlain Sea. Proof of this are the bones of a beluga whale uncovered along the lake's shore in Charlotte, Vermont.

A PLACE IN HISTORY

Many of our freshwater lakes and rivers have an important place in the history of our state and country. Waters such as the Hudson River and Lake Champlain were named after Henry Hudson and Samuel de Champlain, the first European explorers to discover them. Other waters, such as Chautauqua Lake and the Chemung and Mohawk rivers, were named after local Native American tribes. These waters were heavily used for transportation prior to the development of roads and railways.

The Erie Canal, completed in 1825, ran 353 miles between Albany and Buffalo, linking the Great Lakes with the east coast. At the time it was the only major means of transportation through the Appalachian Mountains and was heavily used to transport grain and other items that were difficult to move overland. The Erie Canal helped New York become a major port city and opened western regions to settlement.

Like today's highways, New York's waters were an important transportation network for Native Americans and early settlers.

Our streams and rivers were also important sources of power for mills built by early settlers to grind grain into flour and cut wood. Blocks of ice cut from lakes and rivers were used for refrigeration. Trapping and fur trading was a popular business for early settlers and explorers who sought the abundant beaver, otter and mink in and around our waters. Artifacts from these early settlers can be found along many of our major waters.

New York waters also played an important role in various battles that were fought both before, during and after the United States became an independent country. The Hudson River, Lake Champlain and Lake George provided an excellent water route between Canada and New York that was used by invading forces during the French and Indian war, the American Revolution and the War of 1812. Forts were built to prevent ships from sailing up or down these waters. Towns such as Fort Edward on the Upper Hudson River and Ticonderoga on Lake Champlain still bear the names of these forts. Lake Champlain was the site of one of the first battles fought by the United States Navy during the American Revolution and was also the site of a major battle against the British that helped end the War of 1812.

The Statue of Liberty, a symbol of freedom provided to the U.S. from France in 1886 as a gift of friendship, stands in New York harbor at the mouth of the Hudson River.

Lt. Thomas MacDonough defeats the British navy in an 1814 battle in Plattsburgh Bay on Lake Champlain.

IT ALL HAPPENS IN THE WATERSHED

Every river, lake and pond in New York State is surrounded by an area of land that drains into it called a watershed. A watershed is the land that water flows across or under on its way to a river, lake or bay. Water travels over farm fields, forests, lawns and streets, or it seeps into the ground and travels as groundwater. Watersheds are separated from other watersheds by high points, such as mountains, hills and ridges.

New York is divided into 17 watersheds. The watershed with the largest area in New York is the St. Lawrence River, which drains over 5,600 square miles in northern New York. The Susquehanna River watershed, with only 4,520 of its huge 27,500 square-mile drainage in New York and the rest in Pennsylvania and Maryland, is the second largest watershed east of the Mississippi River.

DID YOU KNOW

The Allegheny River watershed is the only watershed in New York that drains into the Mississippi River watershed via the Ohio River.

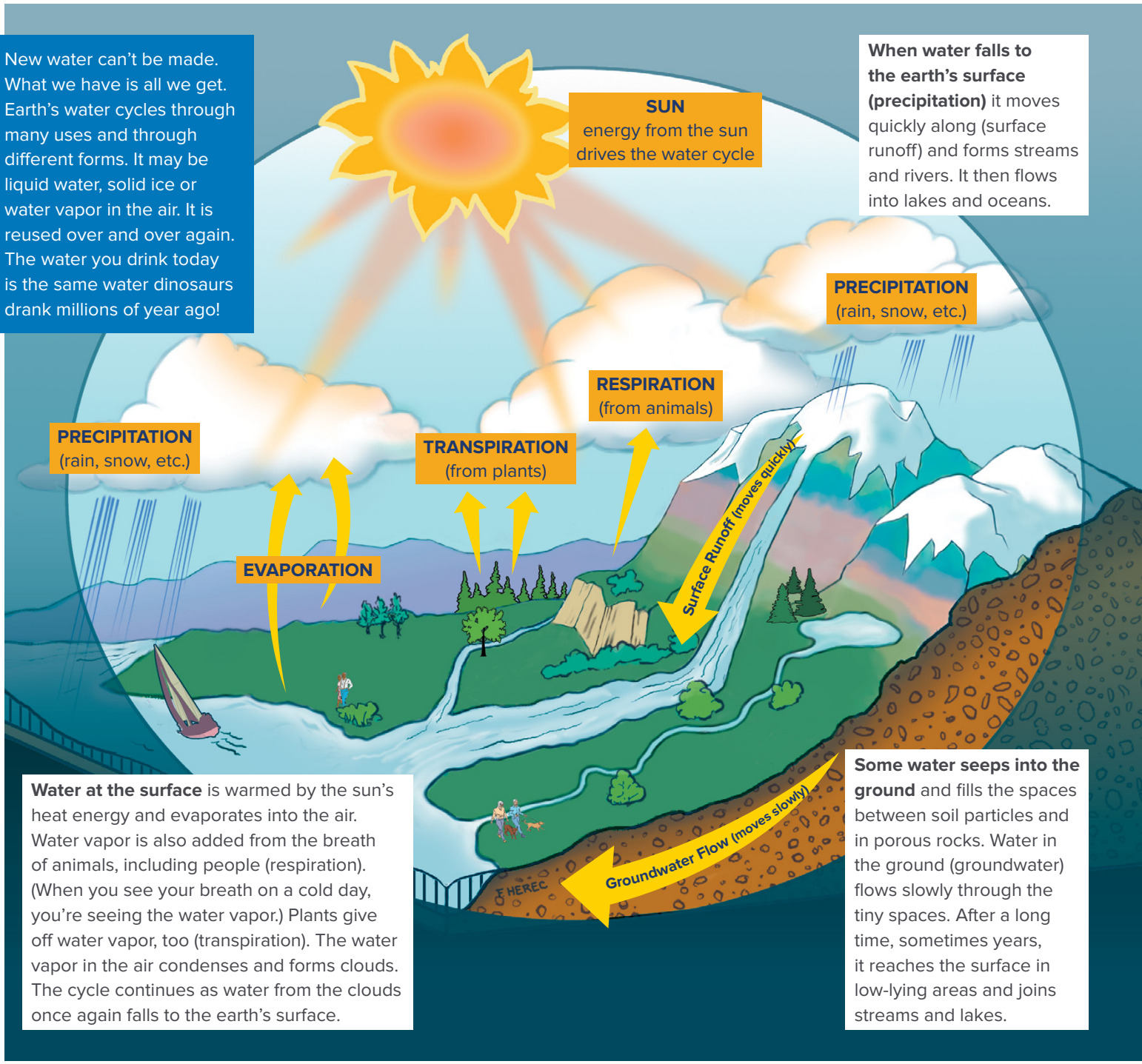
A CONTINUOUS CYCLE

Our waters are an important part of the water cycle, a continuous cycle by which water moves from the earth's surface into the air and back again. The cycle begins when the sun heats water in the ocean, a lake or stream. The heated water evaporates into the air. Water also enters the air from plants and trees through a process called transpiration.

Water vapor in the air cools down and again becomes a liquid. This often occurs when warm air rises over a mountain, or when it comes into contact with colder air. This process is called condensation. When so much water condenses that the air can no longer hold it, the water falls back to the earth as rain or snow. Some of this water seeps into the ground and becomes groundwater, an important source of drinking water. The remainder either evaporates back into the air or enters rivers, streams, lakes and oceans and the cycle continues.

Earth's Water Cycle

New water can't be made. What we have is all we get. Earth's water cycles through many uses and through different forms. It may be liquid water, solid ice or water vapor in the air. It is reused over and over again. The water you drink today is the same water dinosaurs drank millions of year ago!



When water falls to the earth's surface (precipitation) it moves quickly along (surface runoff) and forms streams and rivers. It then flows into lakes and oceans.

Water at the surface is warmed by the sun's heat energy and evaporates into the air. Water vapor is also added from the breath of animals, including people (respiration). (When you see your breath on a cold day, you're seeing the water vapor.) Plants give off water vapor, too (transpiration). The water vapor in the air condenses and forms clouds. The cycle continues as water from the clouds once again falls to the earth's surface.

Some water seeps into the ground and fills the spaces between soil particles and in porous rocks. Water in the ground (groundwater) flows slowly through the tiny spaces. After a long time, sometimes years, it reaches the surface in low-lying areas and joins streams and lakes.

THREATS TO OUR WATERS

Although acid rain and nuisance invasive species often find their way into our waters from sources outside of the State of New York, many of the major threats to our waters occur within our own watersheds. Whether it be oil dumped down a storm drain, pesticides or fertilizers used on a lawn, or runoff from a paved surface, these materials can eventually drain into our waters. Threats to our waters include:

Fertilizer

Phosphorus and nitrogen in fertilizer make our lawns green, but can also cause the nuisance growth of plants and algae when they wash into lakes. This is why caution must be used to ensure that they are used in a fashion that limits the amount that drains from the lands they are being used on. While live plants and algae are an important source of oxygen, they use oxygen when they die and decay. The decay of large quantities of plants and algae can completely use up all of the oxygen in a lake or pond, particularly in the cold deep waters preferred by trout.

Drugs and Other Medications

Although sewage and other household wastes are typically treated prior to being discharged into our waters to reduce impacts to aquatic life, the same is not the case for many drugs and other medications that we discard. These substances can be harmful to creatures living in our waters, affecting their reproduction and behavior.

Hazardous Chemicals

Pesticides, oil and other chemicals dumped into storm drains can be a particular problem for our waters because they do not receive the same amount of treatment that household waste receives. Even small amounts of oil, pesticides, paints, solvents and other potentially harmful substances can cause big problems when they are dumped or washed into storm drains and make their way into our waters.

Acid Rain

When gasoline or diesel is burned in a vehicle, or oil and coal is burned in power plants or furnaces, exhaust gases react with water, oxygen and other substances in the air to form mild solutions of acid. Winds spread these acidic materials hundreds of miles across the atmosphere. When it rains these acidic materials fall out of the atmosphere and into our waters.

Acid rain makes some mountain waters so acidic that fish and other aquatic animals can't survive. Acid rain also causes soils to release forms of aluminum and mercury that can kill aquatic animals or make them unsafe to eat.

Aquatic Invasive Species

Invasive aquatic plants and animals and harmful fish diseases find their way into New York State in a variety of ways. Some come in the ballast water of large ships traveling from ports around the world into the Hudson River, St. Lawrence River and Great Lakes. Invasive species can also be introduced when people dump fish tanks containing plants or animals purchased in a pet store. While many tropical fish cannot survive our cold winters, many aquarium plants quickly take off in our waters.

When an invasive species becomes overly abundant and impacts native species, it is termed a nuisance invasive species. Invasive species do not have to come from another country. In many cases fish introduced from other states or even from other areas of New York have caused problems. Many Adirondack brook trout ponds have been destroyed due to the introduction of common baitfish species. By moving fish from water to another or dumping unused baitfish you can also unknowingly spread harmful fish diseases.

WHAT CAN I DO TO HELP?

- Bring unused medications for proper disposal on special pharmaceutical collection days and never flush them down a household drain.
- Apply fertilizer carefully to minimize how much drains into water bodies.
- Support the efforts of our government officials to reduce or eliminate the causes of acid precipitation and invasive species introductions to New York State.
- Bring oil, pesticides, paint, solvents or other potentially harmful substances for proper disposal on special household hazardous waste days and never dump them down a household drain, in the street, or directly into a storm drain. If you don't know how to properly dispose of a hazardous substance, contact your local DEC office.
- Be sure to dry or disinfect all fishing and boating equipment before you use it in a new body of water. This will prevent the spread of invasive species from one water body to another.
- Never move bait or other fish species from one body of water to another.
- Never litter. Carry out what you carry in. Help clean up your local pond.

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The spiny water flea is one of many aquatic invasive species that have been introduced to our waters.

ACTIVITY

What's Your Watershed Address?

What if your address was described by the water you live near, instead of the street you live on? Look at a map of your area (a topographic map is best) to find the water closest to your home: a stream, river or lake where runoff from your roof would travel to. Where does it go from there? Follow the water until you reach a lake or the ocean. Write down the name of each water body your water travels through, from smallest to largest. This is your watershed address.

Here are two examples:

- WATERHOUSE CREEK
  Oswego River
  Lake Ontario
- MALIANNE CREEK
  West Canada Creek
  Mohawk River
  Hudson River
  New York Harbor

What is your home address?

What is your watershed address?

Water Words

Across

3. Lake shared with Vermont and Quebec that was site of one of the first battles of the U.S. Navy.

4. Type of water found in lakes and ponds.

5. New York's longest river.

7. New York's largest lake found solely within its borders.

10. These species can cause problems in our waters.

13. Glaciers are made of this.

14. What you should do to boats before their use in another waterbody.

17. They covered most of New York during the ice age.

18. Never dump anything down a _____ drain.

Down

1. The area of land draining into a water body.

2. When water vapor cools this falls out of the air.

6. Common species found in coldwater lakes, ponds and streams.

8. This canal runs between Albany and Buffalo.

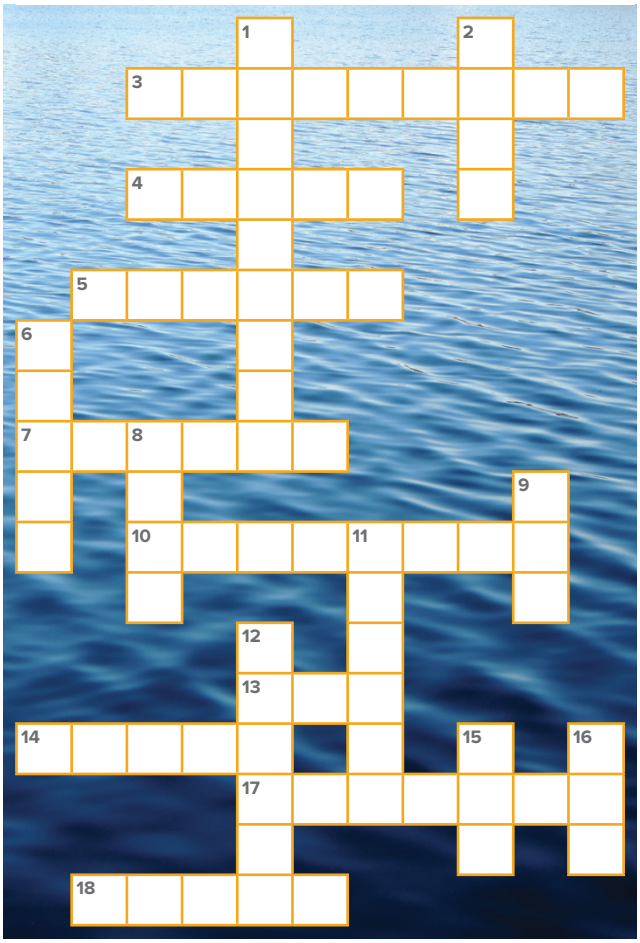
9. Who you should contact if you are unsure how to dispose of a hazardous material.

11. New York's deepest lake.

12. There are 11 of these lakes in central New York.

15. This hazardous material can drain off of paved roads and driveways.

16. Boating and fishing equipment should be _____ before it is used in another body of water.



ANSWERS: Across – 3. Champlain, 4. Fresh, 5. Hudson, 7. Oneida, 10. Invasive, 13. Ice, 14. Drain, 17. Glacier, 18. Storm; **Down –** 1. Watershed, 2. Rain, 6. Trout, 8. Erie, 9. DEC, 11. Seneca, 12. Finger, 15. Oil, 16. Dry