



The Salmon Times

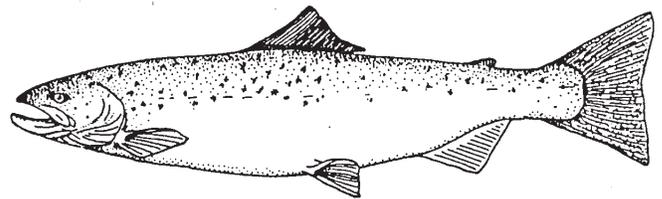
October

Number 1

Welcome to Adopt-A-Salmon Family!

New England is a region full of water. In addition to the cold ocean waters of the Gulf of Maine, an amazing variety of streams, rivers, lakes and ponds dot the landscape. An equally amazing variety of plants and animals, including Atlantic salmon and people, depend upon this resource for survival. As water flows from the mountains to the sea, it connects us all to the natural world. Adopt-A-Salmon Family will give you an opportunity to explore this important concept by focussing on the fascinating world of the Atlantic salmon.

You are in for a fun year. In addition to participating in a variety of interesting activities with your teacher and program facilitator, you will get to "shake hands" with adult salmon, raise a "salmon family" in the classroom, and release the young fish into a local stream. So hang on and let's get started!



Atlantic Salmon, the "King of Sport Fish"

The Atlantic salmon is a very interesting fish. This large member of the trout family is called anadromous because it spends part of its life in a river or stream, where it is born, and part of it in the ocean. Most salmon migrate to the sea after spending a couple of years in the river of their birth. They very quickly reach adult size in the food-rich ocean environment. After several years at sea, salmon return to their home rivers to reproduce. Here the salmon hen prepares a nest in the gravel of the stream bottom and lays thousands of eggs. This life cycle is repeated time and again.

The salmon has always been a valuable fish to people living in New England. They were an important source of food for Indians and the settlers that came later. As more people moved into the region and developed the land, salmon populations began to decline, totally disappearing from some of our rivers. Today, following years of restoration activities, Atlantic salmon are beginning to make a comeback. The decline and recovery of the salmon is a fascinating story that will be told in the coming months!

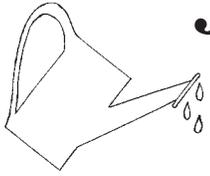
Photo by Sue Pisinski



New Hampshire students get an "up close and personal" view of an adult Atlantic salmon at a U.S. Fish and Wildlife Service hatchery.

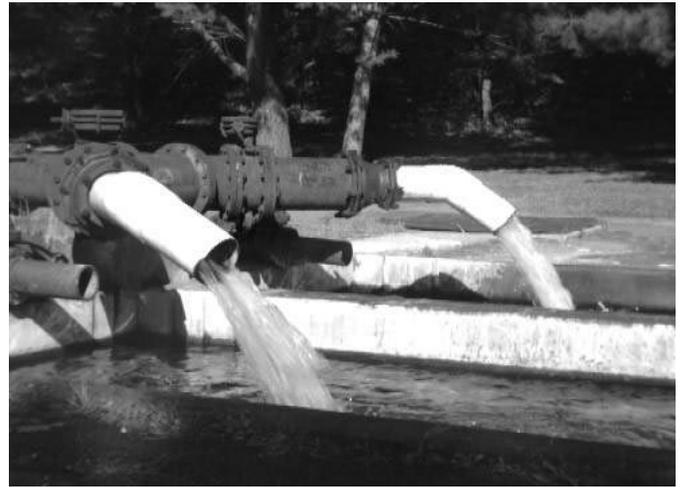
The Water Cycle:

Journey of a Raindrop



Water is always on the go, never staying in any one place for too long. It enters a watershed, stays for awhile, and then moves on. Where does it come from? Where does it go? By following the journey of a raindrop through the water cycle and answering these simple questions we learn how water, a magical substance, connects us all!

Beside the air you breath, water is probably the most important thing in your life. 75% of your body is water. Water covers 75% of the earth's surface. All living things need plenty of clean water to survive. Sometimes we use water as if there was a never ending supply of it. In fact, there is a very definite amount of water in the world. It appears in different forms at different times. We all know about water as a liquid. Ice is the solid form of water. Water can also enter the air as a gas through evaporation.



Water pumped from wells at the Nashua National Fish Hatchery spends very little time with the station's Atlantic salmon before continuing its downstream journey through the watershed.

All water moves through the water cycle. It falls to the ground as precipitation in the form of rain, sleet, or snow. It then flows over or through the land to a body of water such as a river, lake, or underground collection area called an aquifer. As the sun heats the earth's surface, water evaporates into the atmosphere. Plants also contribute water to the air through a process called transpiration. Eventually, the water in the air will condense, falling to the ground once again. This cycle is repeated endlessly.

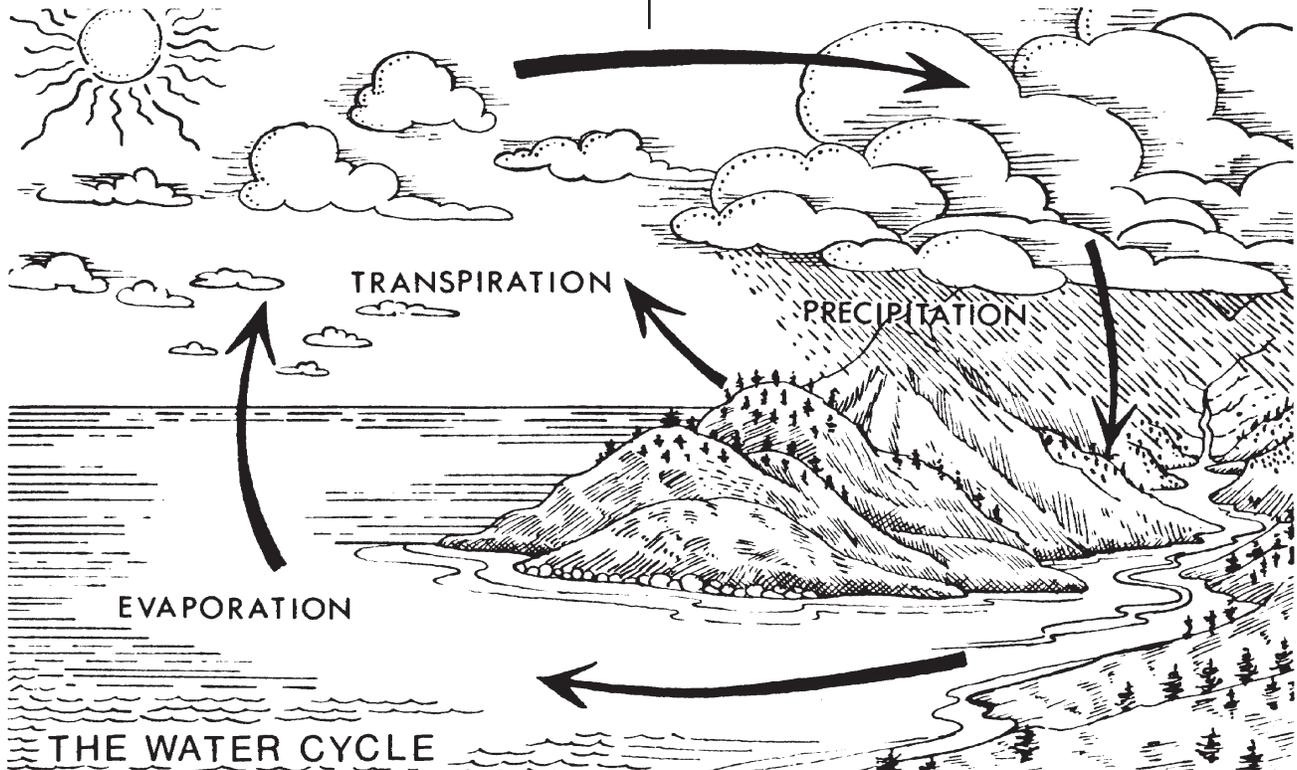


Illustration used by permission of Oregon Dept. of Fish and Wildlife

WATERSHEDS:

We All Live In One!

What do people and Atlantic salmon have in common? Give up? Both live in watersheds. A watershed is a land area that drains into a common body of water. The best way to explain a watershed is to imagine that you are holding a funnel in one hand. In the other hand you are holding a watering can. Holding the can above the funnel, you begin to pour the water. All of the water that falls within the funnel's rim flows through the spout to a common point. This is exactly what happens in a watershed.

High points of land, like mountain ridges, form the rim or boundary of a watershed. These high points are called divides because they divide one watershed from the next. Unless it evaporates or infiltrates into the ground, all the water entering a watershed eventually flows into a common body of water such as a stream, river, pond, lake, or ocean.

Thinking about watersheds is important because they show us how our actions can affect wildlife and the environment. As water flows over and through the land in a watershed, it often picks up sediments and

pollutants. These materials enter water bodies and can harm aquatic plant and animal life, including salmon.

Rivers are a common feature in many watersheds. They generally form where smaller streams flow together. Usually a river gets wider downstream as smaller rivers or tributaries flow into it, adding more and more water. A river is usually widest at its mouth, a point where it flows into another body of water. Many New England rivers flow into the Atlantic Ocean.

As the number of people living in New England's watersheds increased during the 1800's, and more houses and factories were built, the rivers became increasingly polluted. Water pollution was one of the reasons why the Atlantic salmon disappeared from many rivers more than 100 years ago. There were other reasons that we will discuss later.

The state of the Atlantic salmon today says a lot about the health of our watersheds.

Some progress has been made in cleaning up the rivers in the last twenty years.

Programs to restore the salmon have also had some success.

In the months ahead we will explore many different aspects of watersheds. We will learn what each of us can do to improve the health of our environment, giving the Atlantic salmon and all wildlife a better chance of survival.

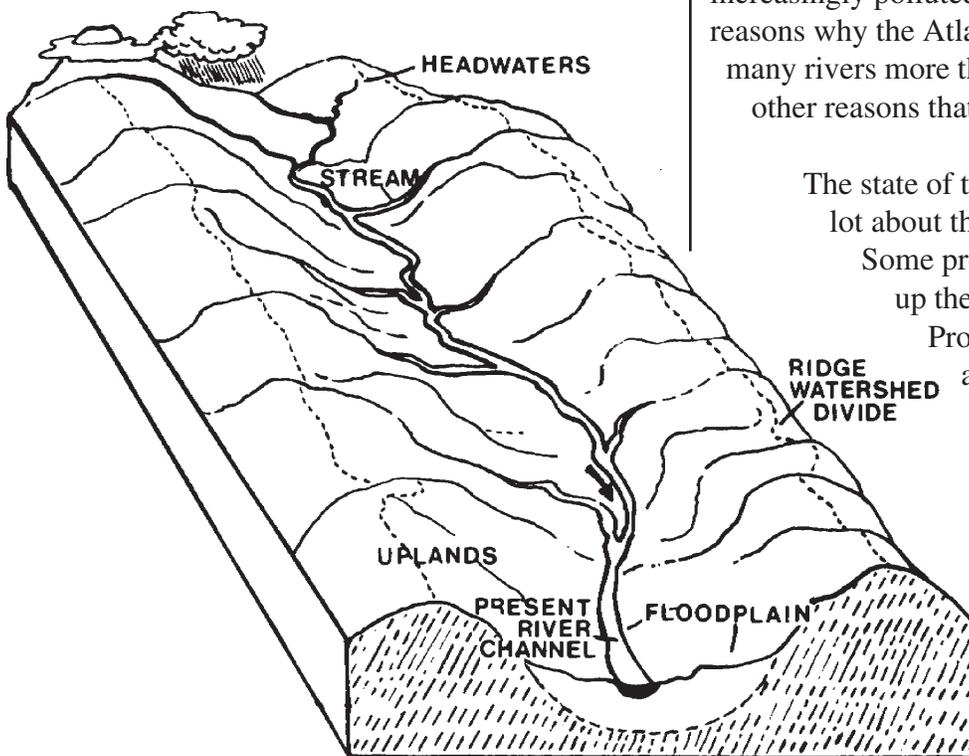
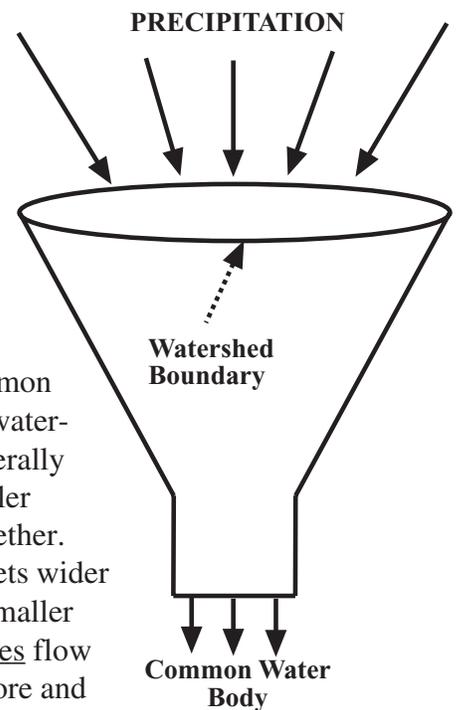
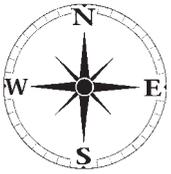


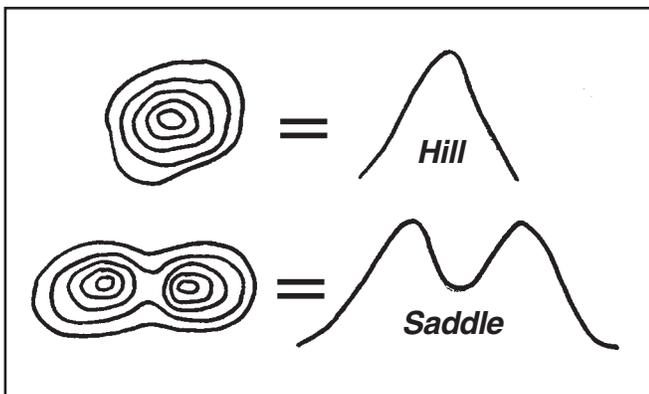
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Putting Watershed on the Map!

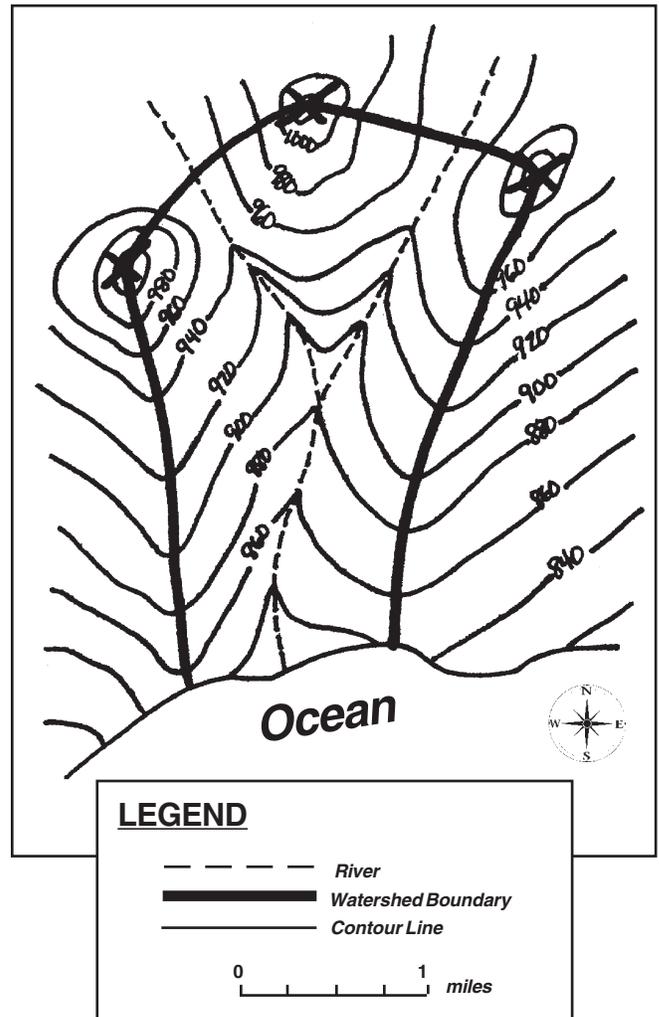
Because most watersheds cover such a large area, the best way to see one is from an airplane. Since most of us don't have our own airplane, maps provide a simple alternative! A special type of map, called a topographic map, is best used for "seeing" a watershed. This is the same type of map you would use with a compass to find your way through the woods.

A topographic map shows the shape of land using contour lines. Each line represents a certain elevation or height above sea level. To move from one contour line to the next, you must go up or downhill. By looking at the shape and distance between contour lines, you should be able to identify hills, mountain ridges, valleys, and other landforms on a topographic map. On some maps you can even determine how deep a body of water is. To better understand the type of information a contour line provides, look at the examples below:



The series of rings in the top example represent a hill or mountain. The other example represents two mountain peaks with a lower segment of land in between, called a saddle. By understanding how contour lines work, and with a little practice, a good map reader is able to look at a topographic map and imagine how the landscape actually appears.

Once you are familiar with contour lines, it is rather simple to locate the boundary of a watershed. First of all, you need to locate the common body of water. In the example on this page, the water body is a river,



(including the two tributaries flowing into the river). Next, place an "X" on all the high points of land surrounding the river. Beginning on the west side of the river, draw a line from the coast, up the ridge to the first peak (first "X"). Continue the line through the other peaks and down the ridge to the coast on the east side of the river. This is the watershed boundary. Pretty simple!

Luckily, topographic maps usually have other types of information that help you to visualize the land. Water bodies, roads, railroad tracks, and buildings help to paint a picture. A legend provides further information such as the meaning of various symbols and a distance scale. You would be surprised how much can be learned from maps!

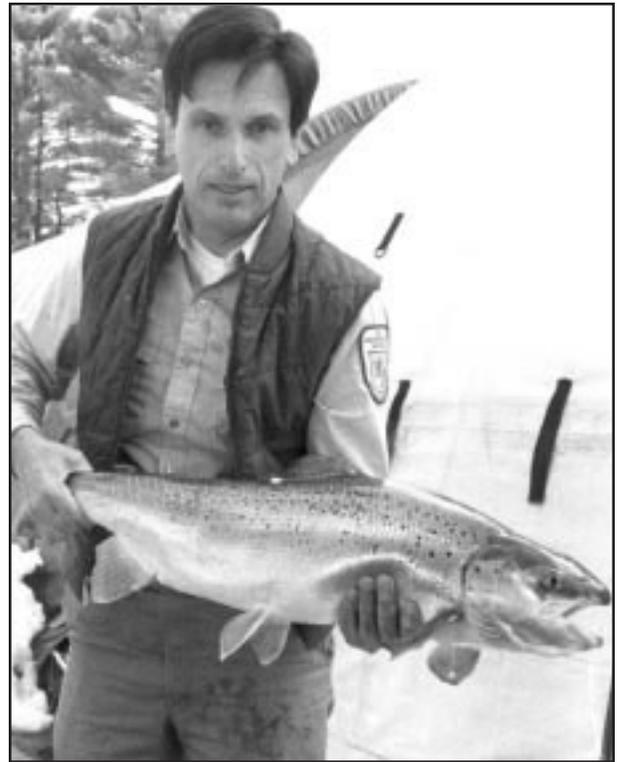
Caring For Fish and Wildlife In New England



The U.S. Fish and Wildlife Service is an agency of the United States Department of the Interior. Its employees are responsible for taking care of the nation's wildlife and the land and water resources the wildlife depend upon. The agency does important research, buys land for wild-

life habitat, protects endangered species, enforces federal wildlife laws, and educates the public about important fish and wildlife issues. The Service has more than 500 wildlife refuges and 80 fish hatcheries across the country that you can visit to learn more about what the agency does.

Since the 1960's, the U.S. Fish and Wildlife Service has been working with other state and federal agencies to restore Atlantic salmon and other anadromous fish to New England's rivers. As an example, millions of young fish have been released into the Merrimack River since 1975. In the spring of 1982 23 adult salmon returned to the Merrimack from the sea. All these fish had started their lives in a hatchery. They were the first Atlantic salmon to appear in



Nashua National Fish Hatchery manager Vic Segarich holding an adult Atlantic salmon.

the Merrimack River since the last century! In all, 22 New England rivers now have salmon returning each year.

Photo by Sue Pisinski



Hatchery workers spawn Atlantic salmon while students from the Adopt-A-Salmon Family program look on.

In November your class will have a chance to witness, up close, the U.S. Fish and Wildlife Service at work when you visit a salmon hatchery. In some cases hatchery workers may actually visit your school. You will get to see the workers spawn full-sized adult salmon, a process in which eggs and sperm are collected from the fish. The eggs, fertilized with the sperm, are the beginning of your "salmon family." Some of the eggs will be placed in your classroom incubator in January. Try to think of some good questions to ask the hatchery workers during your visit!

THE

PUZZLER

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TRIBUTARY
WATER CYCLE
AQUIFER
CONTOUR LINE
ELEVATION
LANDFORM
SADDLE
LEGEND
HABITAT
ENDANGERED SPECIES
FEDERAL

