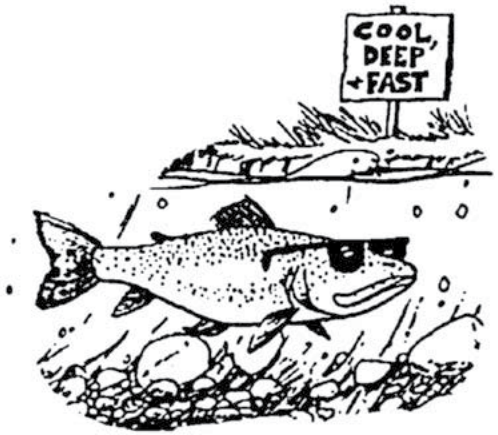
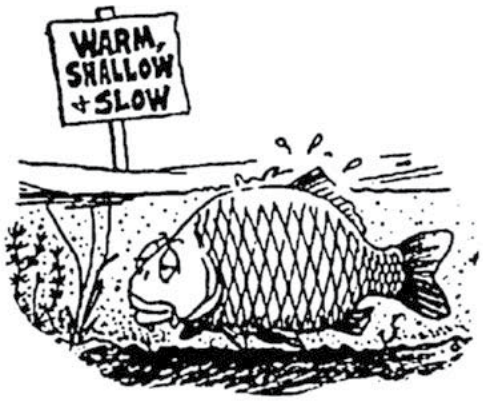
Temperature:
Its Role in Aquatic Habitats

WAV WATER ACTION VOLUNTEERS

Volunteer Monitoring Factsheet Series 2010

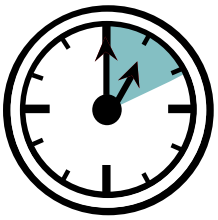




Why are we concerned?

- Temperature changes can affect all aquatic life. For example, warm water holds less dissolved oxygen than cold water and triggers higher plant growth and respiration rates. The lowered oxygen levels of warmer waters are further reduced when plants and animals die and decay.
- Although most aquatic life has adapted to 10 min. survive within a range of water temperatures, some fish species, (trout, for example) require cooler waters. The metabolic rate of organisms, or the rate at which they convert food into energy, also increases with higher water temperatures, resulting in even greater demands on oxygen.
- Research also shows that extreme temperature fluctuations can make fish and insects more susceptible to disease, parasites and the harmful effects of toxic waste.

Time Needed:
10 minutes



Equipment Needed:
- Hipboots
- Thermometer
- Form to record data
- Pen/pencil
- Waterproof gloves (optional)
- Clear plastic cup (optional)

When to Measure:
Check with your local coordinator for schedules

Temperature Conversion Chart

Fahrenheit	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Celsius	.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5	5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4	10	10.6

Fahrenheit	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Celsius	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15	15.6	16.1	16.7	17.2	17.8	18.3	18.9	19.4	20	20.6	21.1

Fahrenheit	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
Celsius	21.7	22.2	22.8	23.3	23.9	24.4	25	25.6	26.1	26.7	27.2	27.8	28.3	28.9	29.4	30	30.6	31.1	31.7

Background on Temperature

Stable water temperature is a critical factor in maintaining the health of a stream and its inhabitants. Temperatures over 78˚ F, (25.6˚ C) for example, are usually fatal to brook trout, which need waters in the range of 55˚- 65˚ F (12.8˚-18.3˚ C) in order to thrive. Other fish such as the small mouth bass can survive an upper limit of 86˚ F (30˚ C) and carp can live in even warmer waters. So as temperature increases, cool water species will gradually be replaced by warm water ones.

One of the most drastic ways that stream temperature is increased is by thermal pollution. Thermal pollution occurs when warm water is added to the stream. Industries such as power plants, paper mills and cheese factories may discharge heated water used in the manufacturing process into the streams. Runoff, in a more indirect way, can also add warm water to streams. Rainwater running off warmed surfaces, especially parking lots, roof tops and roads, increases stream temperatures.

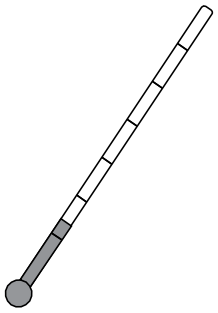
Think Like a Scientist!

Follow the directions VERY CAREFULLY! Accuracy is a must for valid data comparisons.

Mill ponds and impoundments also increase water temperature because they contain a large surface area of slow-moving water which is warmed by the sun, affecting water temperature downstream.

Removing all overhanging trees that shade and cool the stream can also negatively impact stream temperatures. Another factor contributing to higher stream temperatures is eroding soil. Turbid water that results from eroded soil heats up quickly because the suspended sediments absorb the sun's radiant heat. Sediment also makes stream channels shallow. A shallow stream warms up faster than deep waters.

Collecting the Sample



1. To insure consistency in a long-term monitoring effort, the sampling location should be marked in some way. You can tie a piece of surveyor's tape to a tree or drive in a stake above the highest water line. Make sure you have any necessary permission before you mark a site. Record the air temperature before you take the stream temperature.
2. Test in the middle of the stream where the water is moving, not in pools or backwater areas.
3. You can use a standard alcohol thermometer for the measurement. Lower the thermometer about four inches below the surface, as close as possible to the middle of the stream.
4. Leave the thermometer immersed until the reading has stabilized. This usually takes about two minutes. Try to take the reading with the base of the thermometer still immersed. You can fill a clear plastic cup with water and raise it to eye level to read the temperature. Record your measurement. If you measured in degrees F, use the chart on the front to convert and record your measurement in degrees C.

Water Action Volunteers is a cooperative program between the University of Wisconsin-Madison Division of Extension and the Wisconsin Department of Natural Resources. For more information, go to https://wateractionvolunteers.org/