

Anchor Ice

A Super Cool Winter Phenomenon

What is Anchor Ice?

Anchor ice is a unique phenomenon to cold water streams during the winter season.

Throughout the Roaring Fork Valley you may see areas of the river bottom that have a greenish-grey tint. These are areas where anchor ice has formed due to cold temperatures. This is an anomaly for water. Usually when ice forms it floats due to having a lower density than that of liquid water. This is why ice cubes float in water and why icebergs, as heavy as they are, do not sink. If ice did not float, the ocean could freeze solid, killing everything on the bottom. Anchor ice, however, is formed due to the super cooling of the river bottom and seems to break the rule of floating ice.

Formation

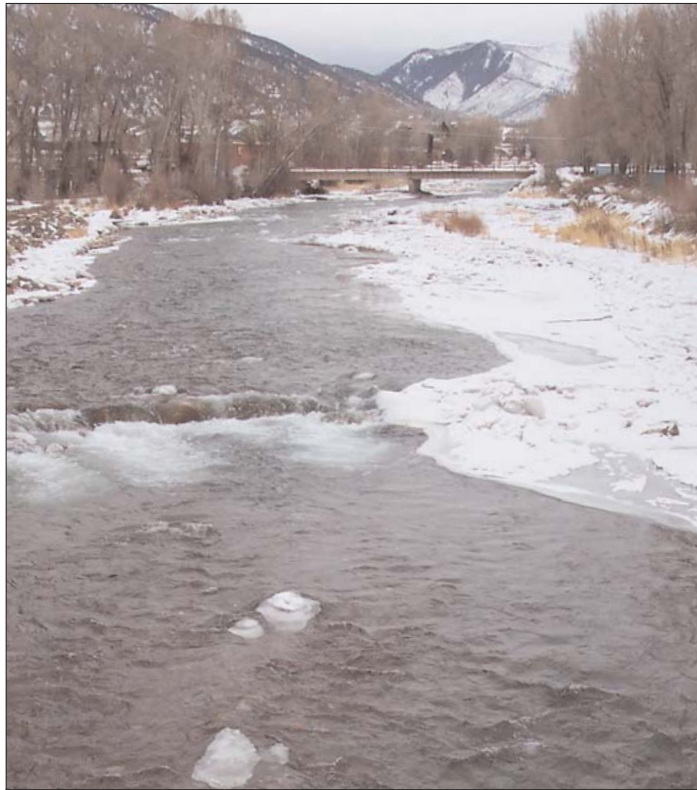
For anchor ice to form, several nights of temperatures 10 to 15°F or colder or a single night below

0°F are needed. Generally, anchor ice forms in a shallow, turbulent section of the river.

Where anchor ice forms on the bottom, water molecules still follow the laws of nature and become lighter as their temperature drops toward 32 degrees. These lighter molecules, on the verge of freezing, get tumbled in the turbulence of the more shallow riffles. One of these molecules hits a rock and adheres to it. Another molecule hits and adheres to the first. More and more molecules, just at freezing, adhere to each other and soon there is a mass of anchor ice on the bottom of the riffle. Eventually the mass of

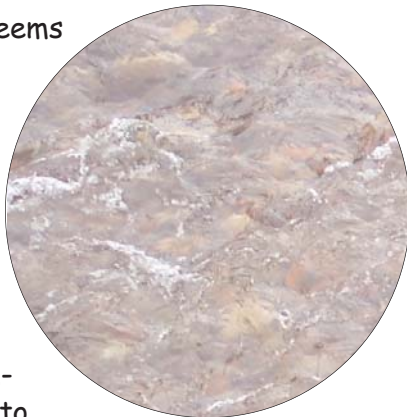
soft, slushy ice breaks loose and rises to the surface to float downstream as slush ice.

Deep streams bordered by thriving healthy riparian areas (i.e., trees and shrubs) are less likely to have ice build-up problems than shallow, exposed streams.



The Roaring Fork River in Basalt experiences periods of anchor ice throughout the winter.

Photographs by Lindsay Hoffmann



The river bottom without anchor ice.



The river bottom with anchor ice.

Anchor Ice in the Roaring Fork Valley

anchor-ice - frozen water that forms at the bottom of a stream.

...continued from previous page

Effects on Aquatic Life

Since anchor ice forms on the bottom of the river, it can affect the habitat of aquatic macroinvertebrates and spawning beds of trout.

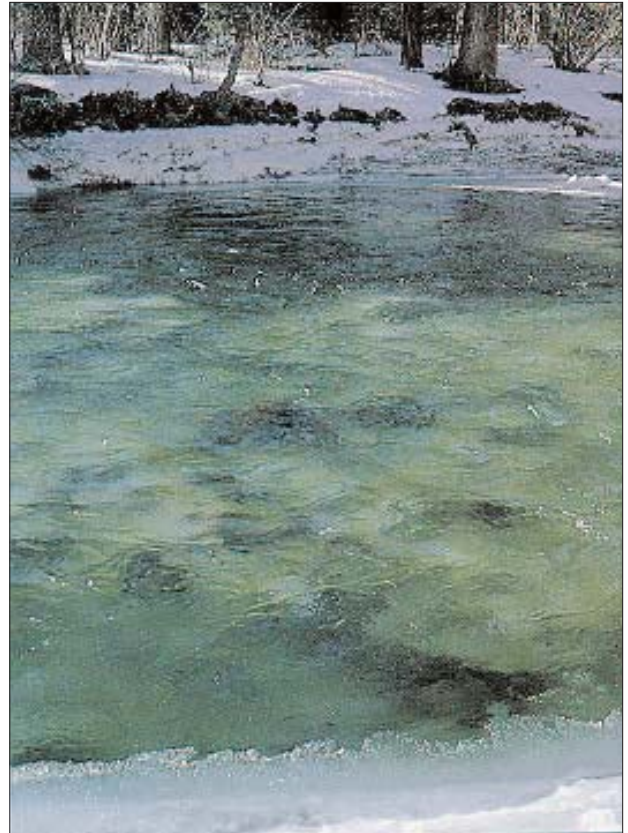
Deep streams bordered by thriving healthy riparian areas (i.e., trees and shrubs) are less likely to have ice build-up problems than shallow, exposed streams.

As it attaches to the rocks and fills spaces in between rocks, the ice's expansion can remove plant matter and macroinvertebrates from the rocks and cobbles as it scours the bottom.

Most biologists agree that anchor ice can seriously impact the river bottom and its inhabitants. There is a potential for damage both when the anchor ice forms and rises to the surface and when the ice spreads out.

Although anchor ice is potentially harmful to aquatic life, the periodic scouring can benefit aquatic insects who lose habitat with excess plant growth.

Look for anchor ice this winter throughout the Roaring Fork Watershed. For more information on anchor ice, contact the Conservancy at (970) 927-1290.



Anchor ice can vary in color from a whitish gray to a turquoise green (above).

Compiled by Tim O'Keefe, January 2003

Some information from: Devil's Elbow Drifts: Anchor Ice and a Frozen River by George Alexander The Riverwatch: Quarterly Newsletter of The Anglers of the Au Sable, Issue #31 and the U.S. Geological Survey.



Roaring Fork Conservancy
P.O. Box 3349, Basalt, CO 81621
(970) 927-1290
www.roaringfork.org

