

## Ice on the Delaware



c. 1851 - Emanuel Gottlieb Leutze

National Park Service

Upper Delaware Scenic and Recreational River

### Ice Descriptors and Engineering

**Anchor ice.** Frazil ice attached or anchored to the river bottom, irrespective of the nature of its formation.

**Beginning of breakup.** Date of definite breaking, movement, or melting of ice cover or significant rise of water level.

**Beginning of freezeup.** Date on which ice forming a stable winter ice cover is first observed on the water surface.

**Border ice.** An ice sheet in the form of a long border attached to the bank or shore; shore ice.

**Breakup.** Disintegration of ice cover.

**Breakup date.** Date on which a body of water is first observed to be entirely clear of ice and remains clear thereafter.

**Breakup jam.** Ice jam that occurs as a result of the accumulation of broken ice pieces.

**Breakup period.** Period of disintegration of an ice cover.

**cfs.** Cubic feet per second, a measure of flow.

**Channelization.** Modification of a natural river channel; may include deepening, widening, or straightening.

**Conveyance.** A measure of the carrying capacity of the river channel.

**Floc.** A cluster of frazil particles.

**Floe.** An accumulation of frazil flocs (also known as a "pan") or a single piece of broken ice.

**Floodplain.** Land area adjoining a water body that is not normally submerged but may be submerged during flood conditions.

**Frazil.** Fine spicules, plates, or discoids of ice suspended in water. In rivers and lakes, frazil is formed in supercooled, turbulent water.

**Frazil slush.** An agglomerate of loosely packed frazil that floats or accumulates under an ice cover.

**Freezeup date.** Date on which the water body was first observed to be completely frozen over.

**Freezeup jam.** Ice jam formed as frazil ice accumulates and thickens.

**Gorge.** In the past, ice jams were sometimes referred to as "ice gorges."

**Grounded ice.** Ice that has run aground or is in contact with ground underneath it.

**Hanging (ice) dam.** A mass of ice composed mainly of frazil or broken ice deposited underneath an ice cover in a region of low flow velocity.

**Hummock.** A hillock of broken ice that has been forced up by pressure.

**Ice arch.** Frazil or fragmented ice that has stopped moving and bridges across a river channel; also called an "ice bridge."

**Ice jam.** A stationary accumulation of fragmented ice or frazil that restricts or blocks a stream channel. The term "ice gorge" is also used in some areas.

**Overbank flow.** Flow that exceeds the level of the river's banks and extends into the floodplain.

**Riprap.** Rocks strategically placed against riverbanks or beds to prevent erosion of underlying material.

**Sheet ice.** A smooth, continuous ice cover formed by in situ freezing (lake ice) or by the arrest and juxtaposition of ice floes in a single layer.

**Supercooled water.** Water whose temperature is slightly below the freezing point (32 °F or 0 °C).

**Thalweg.** Deepest portion of the river channel; the line of major flow.

**Water slope.** Change in water surface elevation per unit distance.

**Water stage.** The water surface elevation above the bottom of the river channel.

**Weir.** Barrier placed in a river to raise water elevation.

## Ice Observations

ICE OBSERVATIONS	DATE 01 28 05	NOTES / COMMENTS
NARROWSBURG TO TMR	Open w/ floating slush ice Approx 20 % shore ice w/ anchor ice in shallow areas	Narrowsburg Pool approx 60% ice covered w/ hummock ice
T M R TO LACKAWAXEN / RB	Open w/ floating slush ice Approx 25 % shore ice TMR Pool, open center	
LACK / RB TO SHOHOLA BR	Open w/ floating slush ice	
SHOHOLA TO B.O. HANSOM	Open w/ floating slush ice Hansom Eddy ice covered w/ hummock ice	
HANSOM EDDY TO POND EDDY	Open w/ floating slush ice Approx 15% shore ice Anchor ice in shallow areas	Pond Eddy Pool ice covered w/ hummock ice
POND EDDY TO MONGAUP RIV	Open w/ floating slush ice Approx 20% shore ice	

## Ice on the East Branch in Hancock



Ice below Lordville, NY piled up



Ice North of Equinunk, PA



## Ice above Callicoon



## Ice on River at Callicoon



## Ice at Skinners Falls



## Ice on the Narrowsburg Pool



## Ice flow at Narrowsburg Bridge



## Narrowsburg DEC access



## Ice pushed onto the Narrowsburg Access



## Narrowsburg DEC Access



## Ice at Narrowsburg Pool



## Ice above the Narrowsburg Bridge



Ice on the river at Lackawaxen



Ice buildup at Pond Eddy



## Aerial view of the river



## Ice Movement

