

Suggested Manning's Roughness Coefficients

Natural Channels	Minimum	Normal	Maximum
<i>Minor Streams (top width at flood stage <30 meters)</i>			
Streams on plain:			
◆ Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
◆ Same as above, but more stones and weeds	0.030	0.035	0.040
◆ Clean, winding, some pools and shoals	0.033	0.040	0.045
◆ Same as above, but some stones and weeds	0.035	0.045	0.050
◆ Same as above, but lower stages, more ineffective slopes and sections	0.040	0.048	0.055
◆ Clean, winding, some pools and shoals, some weeds and many stones	0.045	0.050	0.060
◆ Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
◆ Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages:			
◆ Bottom: gravel, cobbles, and few boulders	0.030	0.040	0.050
◆ Bottom: cobbles with large boulders	0.040	0.050	0.070
<i>Flood Plains</i>			
Pasture, no brush:			
◆ Short grass	0.025	0.030	0.035
◆ High grass	0.030	0.035	0.050
Cultivated areas:			
◆ No crop	0.020	0.030	0.040
◆ Mature row crops	0.025	0.035	0.045
◆ Mature field crops	0.030	0.040	0.050
Brush:			
◆ Scattered brush, heavy weeds	0.035	0.050	0.070
◆ Light brush and trees, in winter	0.035	0.050	0.060
◆ Light brush and trees, in summer	0.040	0.060	0.080
◆ Medium to dense brush, in winter	0.045	0.070	0.110
◆ Medium to dense brush, in summer	0.070	0.100	0.160
Trees:			
◆ Dense willows, summer, straight	0.110	0.150	0.200
◆ Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
◆ Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
◆ Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
◆ Same as above, but flood stage reaching branches	0.100	0.120	0.160
<i>Major Streams (top width at flood stage >30 meters)</i>			
◆ Regular section with no boulders or brush	0.025	--	0.060
◆ Irregular and rough section	0.035	--	0.100
<i>Lined Channels</i>			
◆ Concrete-lined	0.012	--	0.018
◆ Concrete rubble	0.017	--	0.030
<i>Unlined Channels</i>			
◆ Earth, straight and uniform	0.017	--	0.025
◆ Winding and sluggish	0.022	--	0.030
◆ Rocky beds, weeds on bank	0.025	--	0.040
◆ Earth bottom, rubble sides	0.028	--	0.035
◆ Rock cuts	0.025	--	0.045