

Chapter 3. TABLE 3.2

Calculation of *Manning's "n"* from Field Observation [Adapted from Cowan (1956)]

$$n = (n_0 + n_1 + n_2 + n_3 + n_4) m$$

Additive Factors

Material Involved	n_0
Earth	0.020
Rock Cut	0.025
Fine Gravel	0.024
Coarse Gravel	0.0028
Cobble	0.030-0.050
Boulder	0.040-0.070
Degree of Irregularity	n_1
Smooth	0.000
Minor (slight scour)	0.005
Moderate (slumping)	0.010
Severe (eroded banks)	0.020
Variation in Channel Cross Section (location of <i>thalweg</i>)	n_2
Gradual	0.000
Alternating Occasionally	0.005
Alternating Frequently	0.010-0.015
Effect of Obstructions	n_3
Negligible	0.000
Minor (15% of area is turbulent)	0.010-0.015
Appreciable (up to 50% is turbulent)	0.020-0.030
Severe (>50% is turbulent)	0.040-0.060
Riparian Vegetation	n_4
None	0.000
Low (grass/weeds)	0.005-0.010
Medium (brush, none in streambed)	0.010-0.025
High (young trees)	0.025-0.050
Very high (brush in streams, mature trees)	0.050-0.100

Multiplicative Factors

Degree of Meandering	m
Minor	1.000
Appreciable	1.150
Severe	1.300