

## Chapter 9 - Diversions

### Retardance Values

Diversions are only as good as the assumptions and data used in design. One of the most important factors is the correct selection of the retardance factors. Generally, retardance “D” is used in Michigan to select a channel width to give a safe velocity during the establishment period. The next step is to find the depth required for the design capacity when the vegetation has matured. Mature vegetation usually has an A, B, or C retardance. The degree of vegetal retardance depends on the height and density of the vegetation. Table 9-1, Table MI 9-1.1, and Table MI 9-1.2 can be used for this determination. Determination of good or fair stand for design should be made using local experience with the seeding mixture, soils, and climate.

Table MI 9-1.1 General Guide to Selection of Vegetal Retardance Values for Diversions

Stand*	Average Height of Vegetation (inches)	Retardance	Stand*	Average Height of Vegetation (inches)	Retardance
Good	Greater than 24	A	Fair	Greater than 24	B
Good	11 to 24	B	Fair	11 to 24	C
Good	6 to 10	C	Fair	6 to 10	D
Good	2 to 6	D	Fair	2 to 6	D
Good	Less than 2	E	Fair	Less than 2	E

\* Good stand has a minimum of 160 stems per square foot

\* Fair stand has less than 160 and more than 100 stems per square foot

Table MI 9-1.2 Vegetal Retardance – Michigan Critical Area Planting Seeding Mixtures

Seeding Mixture	Mature Height <sup>1/</sup> (inches)	Mowed Height <sup>2/</sup> (inches)	Retardance			
			Good Stand <sup>3/</sup>		Fair Stand <sup>4/</sup>	
			Mature	Mowed	Mature	Mowed
Creeping Red Fescue	12	2	C	E	D	E
Creeping Red Fescue	12	4	C	D	D	D
Creeping Red Fescue Tall Fescue Kentucky Bluegrass Perennial Ryegrass	30	6	B	D	C	D
Tall Fescue Smooth Bromegrass	36	6	A	D	B	D
Tall Fescue Redtop Perennial Ryegrass	30	6	B	D	C	D
Smooth Bromegrass	36	6	A	D	B	D
Smooth Bromegrass Redtop Perennial Ryegrass	36	6	A	D	B	D

<sup>1/</sup> Average height is assumed to be 70% of mature height

<sup>2/</sup> Average height is assumed to be 90% of mowed height

<sup>3/</sup> Good stand has a minimum of 160 stems per square foot

<sup>4/</sup> Fair stand has less than 160 and more than 100 stems per square foot

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