

Draft Tualatin Subbasin TMDL

Appendix 2C-2 How to Use a Shade Curve



State of Oregon
Department of
Environmental
Quality

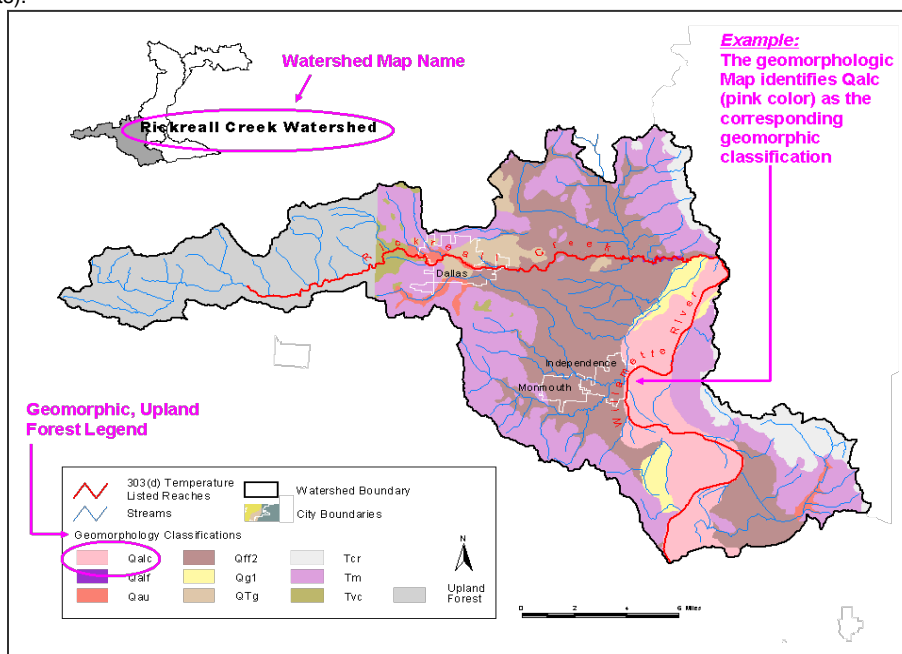
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This appendix was excerpted from the Willamette Basin TMDL (Oregon Department of Environmental Quality, Willamette Basin TMDL, 2006 <http://www.deq.state.or.us/wq/tmdls/willamette.htm>), and thus uses Rickreal Creek as an example. This stream is not located in the Tualatin Subbasin, but the same steps are used to interpret the shade curves that are presented in the Tualatin Temperature TMDL.

How to Use a Shade Curve:

1. Determine the applicable geomorphic or upland forest unit that applies to the stream reach you are applying a Shade Curve to.

Example: You are located in the Rickreall Creek watershed, in the city of Independence along the west bank of the Willamette River. By using the appropriate map, below, you identify the geomorphic unit on your property to be Qalc (Quaternary alluvium floodplain deposits).



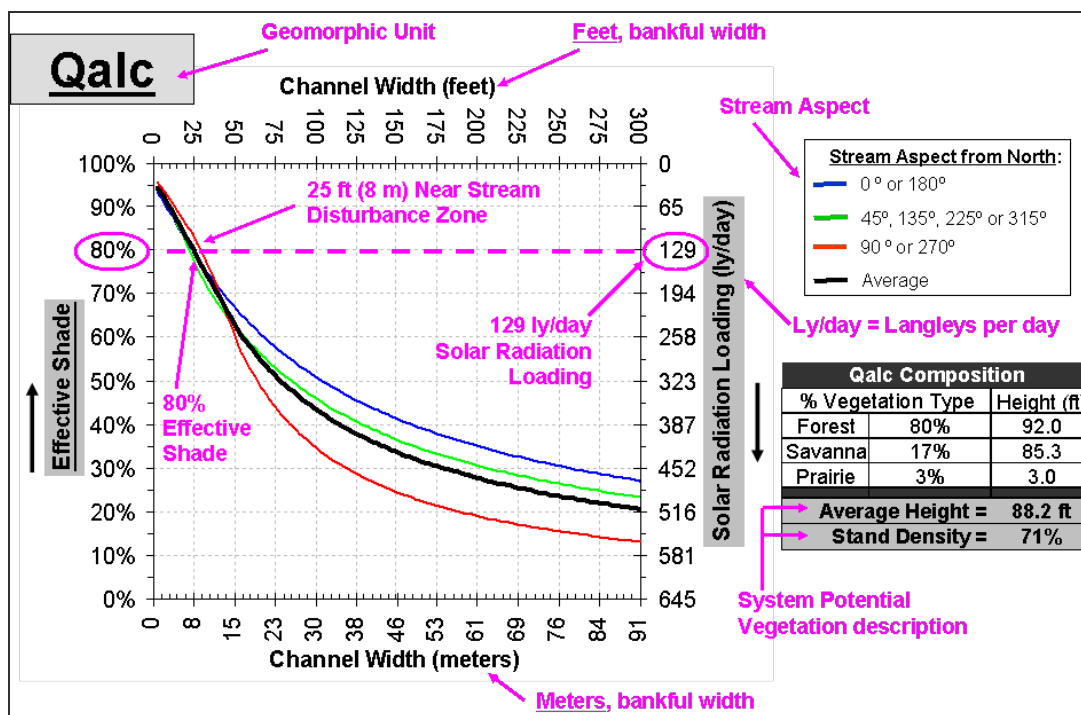
2. Determine the stream aspect from north.

Example: Based on your location on a tributary to the west bank of the Willamette River in Independence, standing in-stream mid-channel, facing north you determine the river's aspect as 0° or 180° from north (this means the river reach runs south to north).

3. Determine the channel width of the stream reach.

Example: At your location you measure the channel width using a tape measure or laser range finder, you determine the stream width is 25 feet.

4. Using the appropriate geomorphic or upland forest Shade Curve, using the appropriate stream aspect line and channel width (x-axis), read the y-axis to determine the percent effective shade and solar radiation loading. This is the non-point source load allocation of the stream reach at system potential vegetation.



Example: A tributary to the Willamette River on the west bank near Independence with a stream aspect from north of 0° or 180° (blue line) and a channel width of 25 feet: using the blue line to determine the loading capacity from the x-axis identify the 25 feet (8 m) mark and read the y-axis, the solar radiation loading would be 129 Langley's/day with 80% effective shade when system potential vegetation is applied to the left and right bank of the stream reach. System potential vegetation identifies the riparian average height, 88.2 feet (26.9 m), and stand density (tree canopy density), 71 %, that would be established in the riparian area. If it is difficult to determine the streams aspect from north, the average stream aspect from north, black line, can be used to determine the solar radiation loading and effective shade.

Conclusion: A land owner or manager living on the west side of the Willamette River near the city of Independence, measures the channel width of the tributary stream as 25 feet (8 m), with a stream aspect from north of 0° or 180°. By using the geomorphic map for shade curve development that is specific to the areas watershed, provided by ODEQ, in this case Rickreall Creek Watershed geomorphic map. The land owner identifies their location and the corresponding geomorphic unit as Qalc in this example. The land owner then uses the Qalc shade curve to identify what the effective shade and solar radiation loading reaching the stream would be when the land owner establishes a riparian area corresponding to the system potential vegetation description. This is considered the nonpoint source load allocation.