

Water Quality Indices

An index is a number that is created by mathematically combining a set of numbers. In and of itself, the index does not represent a particular measurement, but it can be used to make comparisons more simple and intuitive.

Water quality indices combine several different water quality parameters. The particular parameters used to develop a water quality index are picked based on historical information, ecological importance, human use, seasonal fluctuations, and other considerations. For example, water quality indices in the Willamette Valley might consider trout and salmon habitat, drinking water quality, and recreational use.

The particular mathematical formulas used for an index can be weighted so that one or more parameters are more important than others in computing the index. This allows people to include many different parameters without losing sight of which ones are the most important.

So far, we have discussed pH, turbidity, temperature, and dissolved oxygen. To design an index that takes all of these into account, we would first need to scale each parameter properly so that it made up the correct percentage of the index. To do this, we would need to know what sorts of values are typical for the different parameters, and assign these values ratings. For example, suppose that we wanted to assess the quality of local creeks in terms of their suitability for native trout. We might want to assign the following values to our parameters (please note that these are hypothetical values and do NOT necessarily represent actual recommendations):

Parameter	Excellent		Good		Poor	
Dissolved Oxygen	> 10 mg/L	30	5-10 mg/L	20	0-5 mg/L	0
Temperature	< 15 C	10	15-25 C	5	> 25 C	5
Turbidity	< 50 NTU	10	50-250 NTU	7	> 250 NTU	0
pH	6-8	5	4-6 or 8-9	3	< 4 or > 9	0

In the table above, I decided that dissolved oxygen was the most important parameter, so I used higher values for DO than for the other parameters. This results in an index from 5 – 55, with 5 being extremely poor water quality and 55 being excellent water quality (keeping in mind that our goals would be trout habitat).

Questions:

1. Using the above table, what would the Water Quality Index value be for a creek that had DO of 7.6 mg/L, a temperature of 18 C, a pH of 6.7 and turbidity of 15 NTU?
2. Using the above table, what would the Water Quality Index value be for a creek that had DO of 12.8 mg/L, a temperature of 33 C, a pH of 4.5 and turbidity of 68 NTU?
3. Which of the above creeks do you think would be more suitable for trout?