Water quality index (WQI) calculation

In [36]:
```
#calculation of pH
data['npH']=data.ph.apply(lambda x: (100 if(8.5>=x>=7)
                                  else(80 if(8.6>=x>=8.5) or (6.9>=x>=6.8)
                                    else (60 if(8.8>=x>=8.6) or (6.8>=x>=6.7)
                                        else(40 if(9>=x>=8.8) or (6.7>=x>=6.5)
                                            else 0)))))
```

In [38]:
```
#calculation of dissolved oxygen
data['ndo']=data.do.apply(lambda x: (100 if(x>=6)
                                  else(80 if(6>=x>=5.1)
                                    else (60 if(5>=x>=4.1)
                                        else(40 if(4>=x>=3)
                                            else 0)))))
```

In [39]:
```
#calculation of total coliform
data['nco']=data.tc.apply(lambda x: (100 if(5>=x>=0)
                                  else(80 if(50>=x>=5)
                                    else (60 if(500>=x>=50)
                                        else(40 if(10000>=x>=500)
                                            else 0)))))
```

In [40]:
```
#calculation of B.D.O
data['nbdo']=data.bod.apply(lambda x:(100 if(3>=x>=0)
                                  else(80 if(6>=x>=3)
                                    else (60 if(80>=x>=6)
                                        else(40 if(125>=x>=80)
                                            else 0)))))
```

In [40]:
```
#calculation of B.D.O
data['nbdo']=data.bod.apply(lambda x:(100 if(3>=x>=0)
                                    else(80 if(6>=x>=3)
                                      else (60 if(80>=x>=6)
                                          else(40 if(125>=x>=80)
                                              else 0)))))
```

In [41]:
```
#calculation of electric conductivity
data['nec']=data.co.apply(lambda x:(100 if(75>=x>=0)
                                    else(80 if(150>=x>=75)
                                      else (60 if(225>=x>=150)
                                          else(40 if(300>=x>=225)
                                              else 0)))))
```

In [42]:
```
#calculation of nitrate
data['nna']=data.na.apply(lambda x:(100 if(20>=x>=0)
                                    else(80 if(50>=x>=20)
                                      else (60 if(100>=x>=50)
                                          else(40 if(200>=x>=100)
                                              else 0)))))
```

In [43]:
```
#Calculation of Water Quality Index WQI
data['wph']=data.npH*0.165
data['wdo']=data.ndo*0.281
data['wbdo']=data.nbdo*0.234
data['wec']=data.nec*0.009
data['wna']=data.nna*0.028
data['wco']=data.nco*0.281
data['wqi']=data.wph+data.wdo+data.wbdo+data.wec+data.wna+data.wco
data
```

Out[43]:

	station	LOCATION	state	Temp	do	ph	co	bod	na	tc	...	nbdo	nec	nna	wph	wdo	wbdo	wec	wna	wco	wqi
0	1393	DAMANGANGA AT D/S OF MADHUBAN, DAMAN	DAMAN & DIU	30.600000	6.7	7.5	203.0	6.940049	0.100000	27.0	...	60	60	100	16.5	28.10	14.04	0.54	2.8	22.48	84.46
1	1399	ZUARI AT D/S OF PT. WHERE KUMBARJRIA CANAL JOI...	GOA	29.800000	5.7	7.2	189.0	2.000000	0.200000	8391.0	...	100	60	100	16.5	22.48	23.40	0.54	2.8	11.24	76.96
2	1475	ZUARI AT PANCHAWADI	GOA	29.500000	6.3	6.9	179.0	1.700000	0.100000	5330.0	...	100	60	100	13.2	28.10	23.40	0.54	2.8	11.24	79.28
3	3181	RIVER ZUARI AT BORIM BRIDGE	GOA	29.700000	5.8	6.9	64.0	3.800000	0.500000	8443.0	...	80	100	100	13.2	22.48	18.72	0.90	2.8	11.24	69.34
4	3182	RIVER ZUARI AT MARCAIM JETTY	GOA	29.500000	5.8	7.3	83.0	1.900000	0.400000	5500.0	...	100	80	100	16.5	22.48	23.40	0.72	2.8	11.24	77.14
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1986	1330	TAMBIRAPARANI AT ARUMUGANERI, TAMILNADU	NAN	26.209814	7.9	738.0	7.2	2.700000	0.518000	202.0	...	100	100	100	0.0	28.10	23.40	0.90	2.8	16.86	72.06
1987	1450	PALAR AT VANIYAMBADI WATER SUPPLY HEAD WORK, T...	NAN	29.000000	7.5	585.0	6.3	2.600000	0.155000	315.0	...	100	100	100	0.0	28.10	23.40	0.90	2.8	16.86	72.06
1988	1403	GUMTI AT U/S SOUTH TRIPURA,TRIPURA	NAN	28.000000	7.6	98.0	6.2	1.200000	1.623079	570.0	...	100	100	100	0.0	28.10	23.40	0.90	2.8	11.24	66.44
1989	1404	GUMTI AT D/S SOUTH TRIPURA, TRIPURA	NAN	28.000000	7.7	91.0	6.5	1.300000	1.623079	562.0	...	100	100	100	0.0	28.10	23.40	0.90	2.8	11.24	66.44
1990	1726	CHANDRAPUR, AGARTALA D/S OF HAORA RIVER, TRIPURA	NAN	29.000000	7.6	110.0	5.7	1.100000	1.623079	546.0	...	100	100	100	0.0	28.10	23.40	0.90	2.8	11.24	66.44

1991 rows × 24 columns