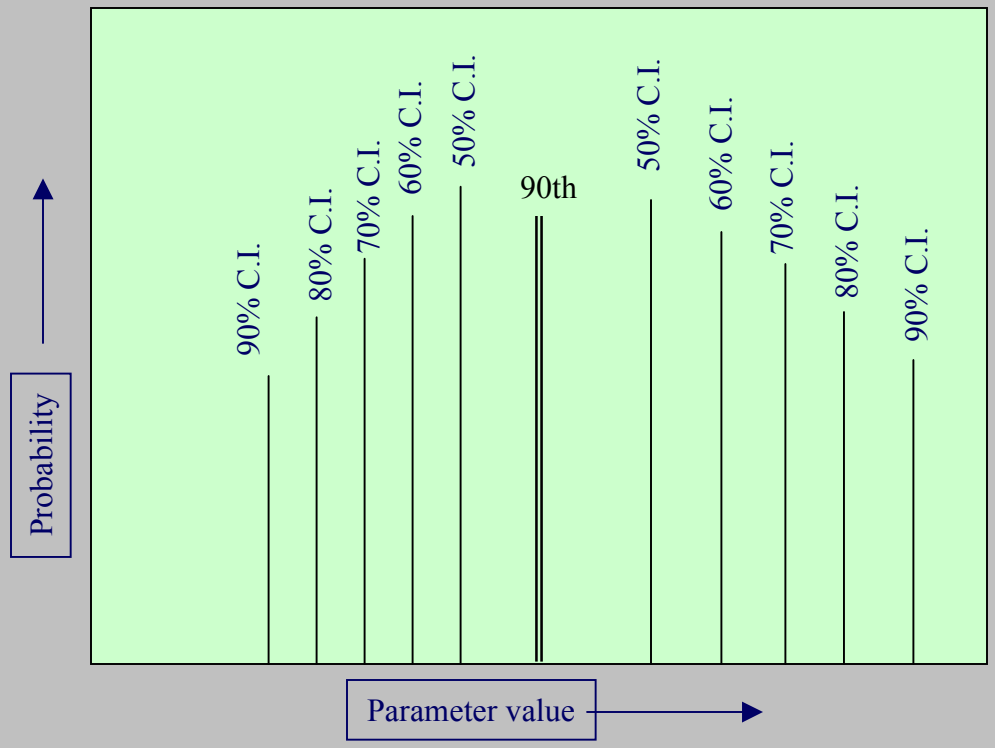
Confidence Interval around a Percentile (CIP): Impaired <10% of the time (EPA guidelines), with 80% confidence (TCEQ currently controls Type I error at 20% on listing).
If the confidence interval (CI) region is below the maximum criteria value for a parameter, or is above the minimum critera value for a parameter, the waterbody is *not* considered impaired.

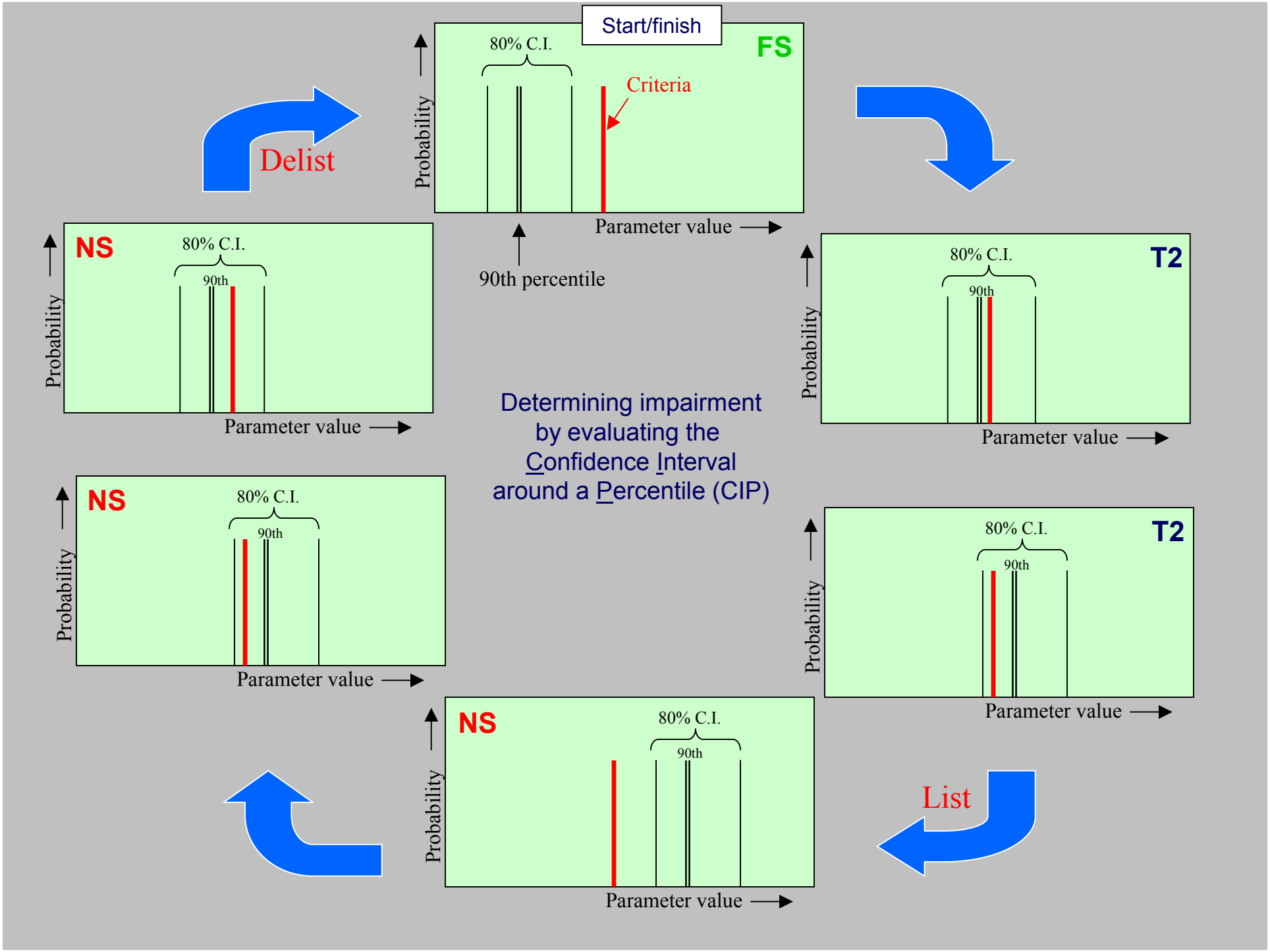
A waterbody is an *impairment concern* if the CI region overlaps the criterion for the parameter of interest.

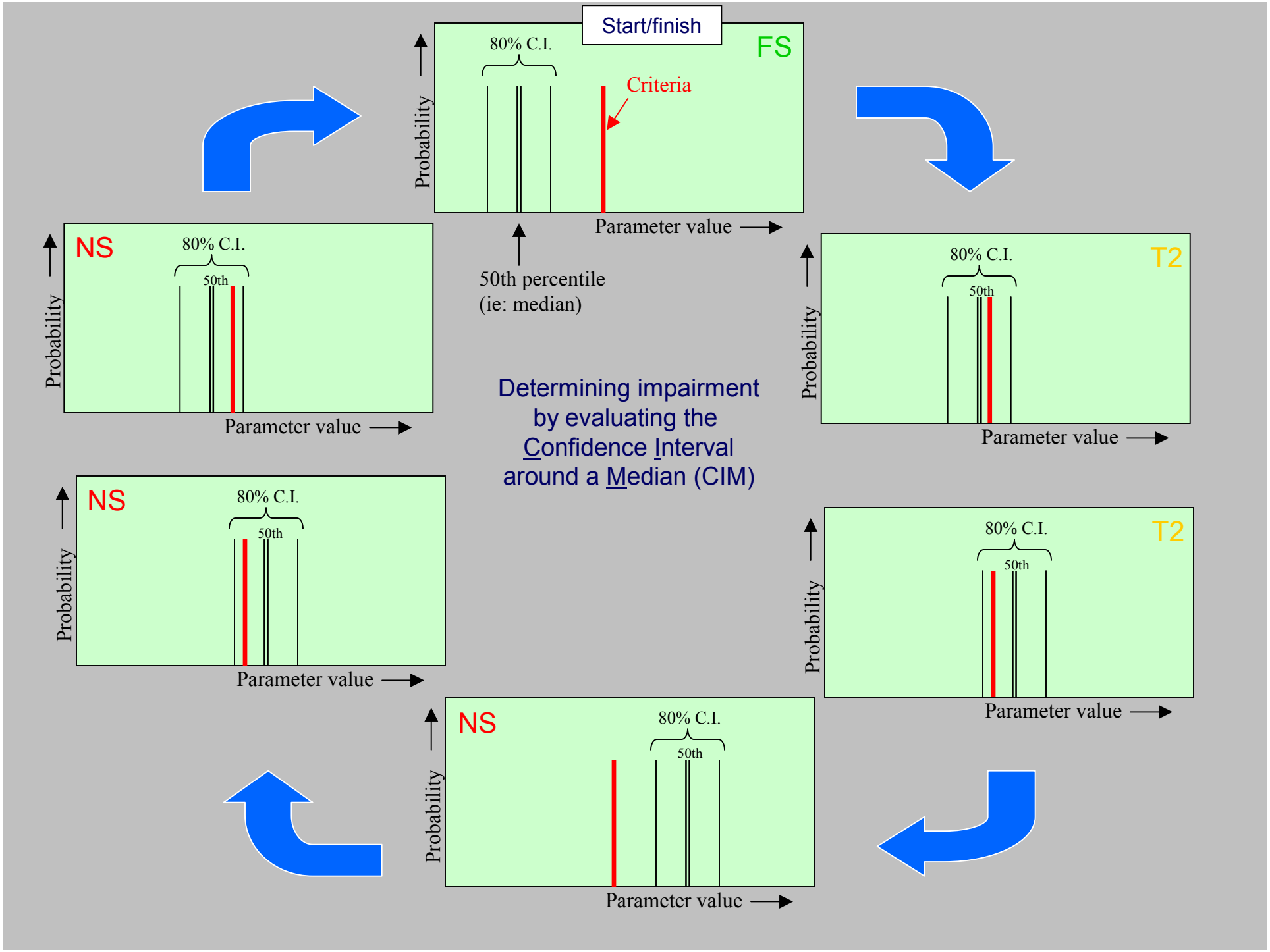
A waterbody *is impaired* if the CI region is above the maximum criteria value for a parameter, or is below the minimum criteria value for a parameter.

H1 = There is less than a 20% chance of falsely impairing a water body that is supporting the criterion 90% of the time (or 75% of the time for bacteria).

Various confidence intervals around a percentile...




Start/finish
FS
80% C.I.
Criteria
Probability
Parameter value
90th percentile
Delist
NS
80% C.I.
90th
Probability
Parameter value
T2
80% C.I.
90th
Probability
Parameter value
Determining impairment
by evaluating the
Confidence Interval
around a Percentile (CIP)
NS
80% C.I.
90th
Probability
Parameter value
T2
80% C.I.
90th
Probability
Parameter value
NS
80% C.I.
90th
Probability
Parameter value
List


Start/finish
FS
80% C.I.
Criteria
Probability
Parameter value
50th percentile
(ie: median)
T2
80% C.I.
50th
Probability
Parameter value
T2
80% C.I.
50th
Probability
Parameter value
NS
80% C.I.
50th
Probability
Parameter value
NS
80% C.I.
50th
Probability
Parameter value
NS
80% C.I.
50th
Probability
Parameter value
Determining impairment
by evaluating the
Confidence Interval
around a Median (CIM)

Summary

<u>When a parameter is not currently listed, assess with recent data:</u>
To avoid the expense and distraction of falsely listing a water body when it is not impaired, the Type I error is currently controlled at < 20%

Missing an impairement: the Type II error is high for small samples, especially near the criteria.

Null Hypothesis: Not impaired
Alternate Hypothesis: Is impaired

<u>When a water body is on the current list, assess with recent data:</u>
To avoid delisting a water body when it it still impaired, the Type I error could be controlled at < 20%

Erroneously continuing the listing: the Type II error is high, especially near the criterion.

Null Hypothesis: Still impaired
Alternate Hypothesis: No longer impaired