Verifying NCs using differing survey results Mtg Notes/DRAFT 10-12-2015

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This discussion centered around what to do when multiple fish surveys on/near a site indicate different NC results—how do we verify which NC to select?

* It is important to assign a single NC which will be assigned more or less ‘permanently’, rather than changing it over time (unless a permanent UAA change is done). This is important for stability of application of water quality standards and permit limits.

**Time frame of data to use:**

For NC verification it is appropriate to use both historic and current data to determine which NC is closest to its natural condition. All available fish community data may be used. Most of our community data was collected after late 1990s; it will be rare to have good data before then.

Note that this differs from the waterbody assessment process, which uses only more recent data to determine current status (data from within the most recent 5 yrs if meets min data requirement; otherwise use most recent 10 yrs).

**A. Multiple surveys from different years at the same site**

If multiple surveys from different years provide different results:

1. Exclude extreme weather years.

2. Determine whether ‘strays’ are affecting the scores; if so, determine the expected survey results without the strays.

3. From the remaining years, compare older/newer data.

a. Is there a change over time that looks like a trend? Is it getting closer to or farther from its natural condition?

🡪 Decide which NC best represents the more natural condition, and assign that NC.

(Note: most often the colder NC will be likely to be the more natural condition. If the warmer NC is closer to its natural state, that is acceptable but an explanation should be provided as to why the colder state was ‘artificial’. This comes into play because the ‘highest’ use achieved at any time since 1975 must be maintained as the Designated Use, unless that use was not representative of its natural state.)

b. Does the waterbody ‘flip flop’ between thermal categories from year to year?

🡪 If so, assign the NC with the colder thermal category, as this is the one with the more protective criteria. This is especially important if it is on the edge between Cold-transitional (which receives Cold criteria) and Warm-transitional (which receives Warm criteria). If there is a strong weight of evidence that an NC with less stringent criteria is the more appropriate natural category, that justification may be proposed.

Notes:

* + In most such cases it is likely that the waterbody would score well using either IBI, so selecting one NC (and its associated IBI) over another should not unduly affect waterbody assessments.
	+ A waterbody may flip because a few individuals from certain species weren’t caught. This could also be considered in assessing the data.
	+ Water withdrawals: The process for making a determination on high-capacity well withdrawals is under development. In this process, Cold-transition may be considered more sensitive to withdrawals than Cold, and therefore Cold-transition may be considered a more protective category than Cold. However, this is not set in stone; various methods are applied. For purposes of NC verification, in cases where we are assigning the more protective standard, we should base it on water quality standards.
	+ If there are species present that are sensitive to a certain toxic then we may need to apply more stringent criteria for certain pollutants in permits.

Model predicts potential of the stream.

* Go with model?
* Go with majority?
* Decision: Go with most protective criteria. Go with “the colder” category.

**B. Surveys from different sites that are near to one another**

How should we determine whether surveys from multiple sites should be considered together or separately? A related question is what extent should we apply survey results to?

[Still need to look at WisCALM “Rules of thumb for aggregating AUs” and see whether/how that fits in]

We recommend using two tools for making this determination.

* First, to determine breakpoints between thermal categories, use the NC model (“Wisconsin Streams Model”). This is the best source for predicting thermal changes.
* Second, to determine land use changes, use the TWSST model. This will indicate whether it may be appropriate to make additional splits based on similarity of land use from segment to segment. (How much should NC verification be based on similarity of land use? Would that be more appropriate for applying waterbody assessment results to adjacent reaches?)

If the upstream & downstream segments from an unsampled site are the same, then it is usually appropriate to assign the same NC to the unknown segment. If upstream & downstream from a site are different from one another, determine similarity of unsampled segment to up & downstream segment, & assign it to the NC that is more similar.

**Additional thoughts for further discussion:**

* Reach ID would be the finest unit.
* Use the smallest breakpoints? (not sure if that applies or not)
* Could we come up with a minimum distance based on stream size? At a minimum, look for stations within X miles or 1 stream order.
* Could we apply a model to tell us the extent of similar segments? There are two ways of looking at that:
	+ Given data at a specific site, plug in the data for that site & have the model tell you what extent of adjacent segments is similar. (Matt would prefer this method to the one below; why?)
	+ Or, define segments statewide a priori through GIS.
* How to verify something we can’t find fish in, but there’s enough flow that there should be fish? Inherent lack of natural habitat, shifting sand, etc.