
Perspectives on the CCL Classification Process and Prototype Modeling

Report for the NDWAC CCL Work Group
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The Classification Process

- Review perspectives
 - on the CCL Classification Process
 - on the role of the models

- Address some of the issues related to the process and use of the models

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Perspective

CCL Classification is a Judgment Process -

based on an evaluation whether or not a contaminant is likely to occur in drinking water - and be harmful if it does

- ❑ Models to aid in moving from PCCL to CCL make process more consistent and transparent
- ❑ Model is pattern recognition algorithm – to replicate past decisions (those made with the training data set)
- ❑ Automaton is probably a misnomer
- ❑ Attributes are ranked scales 1=good 10=bad
- ❑ Need to be careful not to imply unjustified precision

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Perspective

- CCL Classification is a Judgment Process

“Quantification does not eliminate subjectivity, but it discourages vagueness”

From page 1, chapter 1 of “Environmental Systems Optimization” by Doug Haith

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Perspective

- On Attribute Scoring
 - If we had same data available for all contaminants over time this wouldn't be necessary
 - Imprecision embedded in the range of data elements to be used; uncertainty inherent
 - Attributes are ordered categories (ranks)
 - Some approaches to handling uncertainty/confidence imply false precision in the assessment

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Calibration-Scales-Scoring for Attributes

- On Scales for Scoring Attributes
 - What should the scale be?
 - 1-3 – good, bad, ugly
 - 1-10
 - 1-100
 - The whole real number line...
 - 1-10 consistent with the level of precision inherent in this process

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Calibration-Scales-Scoring for Attributes

- ❑ Defined scales/calibration and scoring processes for attributes improves transparency, consistency
- ❑ Establishing scales documents decisions, and increases transparency (“discourages vagueness”)
- ❑ Defined Scales - Experts make 50 decisions up front versus trying to make individual decisions on 1,000 contaminants

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Calibration-Scales-Scoring for Attributes

- ❑ Same scales must be used for the training data and all subsequent contaminants evaluated
- ❑ Calibration scale can be related to “1-10” in many ways - Data do not assume normal distributions across the scale
- ❑ Ensure end members (1 and 10) fit the important end members of the properties of the data element/attribute
- ❑ Scales must cover the range of conditions expected and shouldn't cluster around one or two scores

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Independence

- On Magnitude, Potency and Independence of the Attributes
 - Concern about adjusting Magnitude related to Potency - they will no longer be independent variables
 - Model usefulness is not contingent on assumption of independence among attributes
 - Final model is likely to use a subset of the 5 attributes

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Missing Data

- On Persistence-Mobility and Missing Data
 - NRC – “For PCCL contaminants that have demonstrated occurrence in water, the occurrence attributes of prevalence and magnitude should be scored and take precedence over their persistence-mobility scores. However, *in the absence* of data on occurrence persistence and mobility should be used to assess the potential for significant occurrence”
 - Not all models being considered can deal with “missing” data; no models deal well with “either-or” situations

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Microbes

- On Different Scales/Definitions for Microbiological and Chemical Attributes
 - There are many issues related to the differences between chemical and microbiological contaminants
 - What if it is not feasible to use/score all attributes for microbiological contaminants at this time?
 - What if the attributes require different definitions and scales for microbes than chemicals?

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Microbes

- Several options:
 - Use separate models for chemicals, microbes
 - Include a “dummy” (indicator) attribute
- Final model will not likely use all the attributes
 - Test models and see what is necessary

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Conclusions

- Don't worry, be happy...