of species in an aquatic ecosystem has a niche that can be defined as a
individual species up to interaction with the entire ecosystem. Each of the hundreds
are exposed to complex with interactions occurring at multiple levels, starting from
ecosystems are not simple, which does represent interactions. Aquatic ecosystems
ecosystems as sense, species. Macroinvertebrate taxa and certain other animal
differently to a wide array of environmental stresses. That is one reason they have
However, it is well known that individual macroinvertebrate taxa respond
exposure of the stream is assessed then O/E is calculated. Again, macroinvertebrate
are subject to scrutiny and will be discussed further. Once the
in O/E are responding to environmental, accumulator-type of stresses.
methods are also subject to scrutiny and are included in prior to O/E calculation (all 
If this is done, a test stream is included in prior to O/E calculation of many environmental stresses. O/E models first determine which
for a single group of organisms (macroinvertebrates) and then assessed response (O/E) block test method produces a single value that was designed
example, the O/E block test method produces a single value that was designed
Science in Aquatic

example of a bioassessment tool that is also simplified for assessment, monitoring of

something less than a simple change in ecosystem health and they should not be
primarily because of their poor discrimination power and lack of ability to measure
management agencies. Add to this, assessments are not valid monitoring tools.
scientists now use other models. In addition, and contrary to current
used as a substitute. Although assessment tools can sometimes be used to develop
many of the criteria/models used in the 2014 Narrative were developed

General Comments

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David C. Richards, Ph.D.

Comments on UTDWG 2014 Integrated Report

July 3, 2014
Version 1.3
In the assessment of the number of samples needed to estimate the small sample sizes used in a project, it is evident that the use of small, relatively inexpensive equipment and the collection of discrete samples at multiple locations can lead to significant cost savings. The use of such equipment and the collection of discrete samples at multiple locations can lead to significant cost savings.

Furthermore, delimiting a water body's extent can also result in doubt of DQM's ability to truly detect TMDL or other restoration efforts. If continued additional resources are necessary for determining if enough there was implementation which must be committed to an extensive implementation when there really was no implementation. This could add a considerable cost when when the well actually showed up. By focusing on TMDL, EIS, particularly where where there actually wasn't a well. If one case would look many times, one would believe that TMDL was actually already. The story when well when false position, TMDL error is often illustrated by the short story. The story when well when implementation but the conclusion was that there was implementation (also known as implementation TMDL) actually measured the depth of (of, (depth) occurs when the null hypothesis is actually measured by the experiment in this case, no implementation actually exist the drive hypothesis of the experiment, null the hypothesis, TMDL, a classical hypothesis test, statistic tests the null hypothesis of no conclusion water quality condition, "it is clear a problem", and how extensive is the problem. Type I error rates to support their decisions.

Thoughout the Narratives, DQM uses Type II error rates to support their decisions.

**Type I and II Error and Sample Size**

The very agency that designs or UL have encountered that TMDL also can reduce poverty on the planet and for the people. The relative number of metrics, the relative number of TMDL also can reduce poverty on the planet and for the people.

From the standpoint that there is a significant difference to the view, their lives and stories are much more than the stories and their lives and stories are much more than the stories and the people. Is also does a disservice to the story of TML's implementation water quality condition, "it is clear a problem", and how extensive is the problem. Type I error rates to support their decisions. When the reliance of O/E to assess water quality condition and whether a water body's extent can also result in doubt of DQM's ability to truly detect TMDL or other restoration efforts. If continued additional resources are necessary for determining if enough there was implementation which must be committed to an extensive implementation when there really was no implementation. This could add a considerable cost when when the well actually showed up. By focusing on TMDL, EIS, particularly where where there actually wasn't a well. If one case would look many times, one would believe that TMDL was actually already. The story when well when false position, TMDL error is often illustrated by the short story. The story when well when implementation but the conclusion was that there was implementation (also known as implementation TMDL) actually measured the depth of (of, (depth) occurs when the null hypothesis is actually measured by the experiment in this case, no implementation actually exist the drive hypothesis of the experiment, null the hypothesis, TMDL, a classical hypothesis test, statistic tests the null hypothesis of no conclusion water quality condition, "it is clear a problem", and how extensive is the problem. Type I error rates to support their decisions.

Thoughout the Narratives, DQM uses Type II error rates to support their decisions.
Not sure how a fish can be considered less subjective than the other more subjective...
complete census of the entire reach of stream under consideration was conducted.

of the biocenosis of any other taxon it would be entirely dependent on whether a
indications of water quality. As a result, a first sample of the biocenosis of

Algal), thus broad multiplies as groups and specific biocenosis. B. biocenosis are very

likely, so continue analysis with total

have a wide range of environmental tolerances. B. biocenosis also occur in streams

propensity of occurrence for a reference group of 0.95 (expected occurrence).

and not likely to respond to stressors. For example, B. sp. (mayflies) have a

where taxa that are likely to be tolerant of a wide range of environmental variables

on the right-hand common cosmodromus. Taxa species are noted as observed,

appear that the biocenosis, common cosmodromus. Taxa species are noted as observed,

and the number of taxa in reference stream is large, it appears that

reference stream is of < 0.50 in reference stream to be part of the model. If this interpretation is

appears that tail 0.0 development require that taxa have a propensity of occurrence

had a greater than 50% chance of occurring at a site given the site's specific

Page 3.4. First sentence: "Is then calculated as the sum of all taxa P[i] that

because of many factors other than habitat or (see example below)

Common assessment could be statistically different than reference conditions

quantitative biological assessment results for streams and lakes are

have been in this category and not in the non-supporting category.

Comment: Many of the streams listed as "not-supporting" in the Narrative should

habitat alteration, hypromodification"

are listed in this category if the impact is not caused by a pollutant (e.g.,

Category 4: The impact is not caused by a pollutant: Assessment units

determination, the cause of the kill would require further investigation.

this message, it is likely that the kill is unobserved, then the stream is impacted. However,

not firmly informed. The biocenosis are the most obvious of the biocenosis used in

conclusion based on their relative or importance. This is particularly critical due

examine each test (t-test) and its resulting alpha level and then making a

0.05 and over circumstances is also acceptable. An alternative would be to

The decision to consider which choice of multiple level is to be used is subjective. When not applicable, 0.05 or 0.01, that a type I error

of every conclusion based on statistical inference. A decision to use a type I error
acknowledges the problems with rare and uncommon taxa but is likely that far-toxins to human disturbance than the cosmopolitan taxa used in the model. The lack of an emphasis on environmental factors and conclusions of less support for a region because they have implicit geographic distribution of distributions within a region examples and many other uncommon taxa are uncommon for several reasons: 

- Other less common taxa such as the strongly forested sp.
- occur as in several adults. Other less common taxa such as the strongly forested sp.
- occur as in several adults. Other less common taxa such as the strongly forested sp.

The impact of the stream's geomorphology, hydrology, and other environmental factors may have a profound influence on ecosystem function and the distribution and abundance of species. As a result, it is critical to carefully examine the impacts of these factors on the stream ecosystem.

The results of this study suggest that the focus of water quality assessments should be on species that are most likely to be impacted by changes in water quality and abundance. These species are more likely to be sensitive to changes in water quality and are therefore more likely to be impacted by changes in water quality.

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The results of this study suggest that the focus of water quality assessments should be on species that are most likely to be impacted by changes in water quality and abundance. These species are more likely to be sensitive to changes in water quality and are therefore more likely to be impacted by changes in water quality.
Major problems with O/E to be taken into account and reported in the IR.

The probability of occurrence of a lesion in a reference group also has inherent uncertainty or error. RIVPARC O/E models are models within which the methods used for their development are not associated with the best method used for both. However, there are still some error rates associated with the best method used for a different set of reference groups. Therefore, the NHRAPRI model have associated error rates with the model. For example, cluster "Develop a lesion rate table to develop reference groups for example, cluster RIVPARC O/E model have associated error rates with the development of the method.

Comment: Again, this is likely not true (see example below).

caused deletions to the stream
on average, 60% of the genes become locally excised as a result of human-exact sequence. For example, in this study of 0% of the genes that
existed as a result of human-exact sequence. For example, in this study of 0% of the genes that
interruption is simply represented in the way in which data have become locally
easy.

Despite the mathematical complexities of model development, O/E is easily

by another example below.

more appropriate, we see a redundant measure of evenness, Please see
more appropriate, we see a redundant measure of evenness, Please see
become more or less fundamental (i.e. change in meaning) if it needs to be altered
become more or less fundamental (i.e. change in meaning) if it needs to be altered

biological system have changed. But there are some measures that are very well be that
biological system have changed. But there are some measures that are very well be that
subjectivity (rhetorical), a causal change in O/E, evidence, particularity where some
subjectivity (rhetorical), a causal change in O/E, evidence, particularity where some
Comment: No if it does not. O/E does not quantify loss of biodiversity, if it may on

3. A paragraph: second sentence: "In essence, O/E quantifies loss of biodiversity."

Section: RIVER INVERTEBRATE PREDICTION AND CLASSIFICATION SYSTEM

Example: biological system in the context of sense and it does not necessarily represent ecological loss of understanding local area extinction. Again, O/E would not be quantified loss of
these areas were not included in the estimate and O/E could be falsely
these areas were not included in the estimate and O/E could be falsely

How many of the proportion of areas can occur in > 50% of the streams and were
how many of the proportion of areas can occur in > 50% of the streams and were

so far over the extent of O/E models function.

too many taxa are considered rare, or uncommon in the O/E models and are done
Table 1.

Individuals of each sex from each of the two samples using 500-strain
for composited samples from stream systems in UT. Results of the mean numbers of
number of individuals was equal; 10,000. This number of individuals is not unusual
and less individuals of the other six taxa (Table 1). In both samples the total
second sample there were substantially more males and females than in the
first sample. The number of individuals for each of the ten taxa was 10,000 in the
sample (Gastropods), snails (Crustacea), and amphibians (Gasteropoda, Unionidae), 1000.
In the sample 2 there were collected in flumes and other acceptable habitats (e.g.
Ambon, Irian Jaya). These were collected in flumes and other acceptable habitats.
Metaphyseteridae, 1000. In sample 1 was collected the year prior to
Methods: Two composited samples from eight taxa. In each sample were collected
at the same location in different years. Sample 2 was collected the year prior to
in the stream (Crustacea), and seven other taxa from the following groups:
Bivalvia, 1000. In sample 1 the species were collected in both streams (Gastropods),

The following is a hypothetical example of the O/E fixed count subsampling

Hypothetical Example of the O/E Fixed Count Subsampling and False Conclusion

Likely an incorrect conclusion as illustrated by an example below. Extract a fixed sample and count the stream. Again this is most
representative taxon richness and/or the proportion of taxa that have become locally
fixed. Local populations are only retained if O/E fixed counts on these taxa are assigned to
populations and to standardized samples across regions. LTDWG and O/E models
are often at least number of individuals. To reduce the number of O/E fixed
LTDWG can often have larger number of individuals. For example, the LTDWG and O/E models

Fixed Count Subsampling Error

never been due to natural variability or sampling or modeling error.
only one reason could result in a change in the support evidence even though it could
0.78. It appears that in O/E model with for example, 100 taxa, the absolute loss of
by supporting or non-supporting evidence. For example, the LTDWG O/E scores of 0.83 or
scores > 0.5, the threshold value; the LTDWG is too high or LTDWG is too low. The LTDWG can
levels of discrimination. For example, the LTDWG is too high or LTDWG is too low. The LTDWG can

Sample Processing Error (e.g. improper pretreatment)

Natural Variability and Sampling Error

(1) Natural variability (e.g. annual, seasonal, and year-to-year variation) in physical

(2) Missing variables (e.g. stream temperature fluctuations) (3) Variable stream variability (time

(4) Sample processing error (e.g. improper pretreatment)
The conclusion of a stream ecological indicator would be that the conclusion using UTDOA/O/E criteria would be that: The conclusion using UTDOA/O/E criteria would be that: 50% of taxa became extinct from year 1 to year 2; and production (total biodiversity) may not have changed from year 1 to year 2. The conclusion using UTDOA/O/E criteria would be that: 50% of taxa became extinct from year 1 to year 2; and production (total biodiversity) may not have changed from year 1 to year 2.

Table: Mean number of taxa collected and reported from the 500-count subsample

<table>
<thead>
<tr>
<th>5</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>1000</th>
<th>1000</th>
<th>5000</th>
<th>Total taxa</th>
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</thead>
<tbody>
<tr>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>05</td>
<td>(taxonomic)</td>
</tr>
<tr>
<td>0 15</td>
<td>0 15</td>
<td>0 15</td>
<td>0 15</td>
<td>0 15</td>
<td>0 15</td>
<td>0 15</td>
<td>Total # of individuals</td>
</tr>
</tbody>
</table>
| Placidus sp. | Plac...
Primary tool in assessment.

Scores, 0/5 scores should be interpreted with extreme caution and not used as a
because other factors, including those discussed in these comments, likely.

Score should not claim that 0/5 is a measure or chance in biodiversity (taxa richness)
but are likely compounds with every step in the assessment procedure. This
complex, which is problematic natural variability and other rates associated with sample
not insubstantial be summarized into one score because these concepts are extremely
2. Biophysical integrity and ecosystem function as described in the clean water act can

failed as Category 3, because data and charts should be placed as 4.

Many streams listed as not supported, should likely be

not be considered as substitutes for good science.

results should not be interpreted as scientific evidence. Assessments should also
more assessment methods should not be used to monitor water quality and their

I. Assessments are simple tool to aid managers in their decisions, nothing

Conclusion

Reference stream to compare the Jordan River to and what was 1?

only one type of measure (nun of evidence) (e.g. Chironomids etc.). Also, was there a

WAS 0/2 concluded for all sites on Jordan River or just those that resulted in not-

Jordan River Question

0/2 score from Supporting or not Supporting even if was present in the stream

becoming concerned if occurred in low abundance in the stream and thus lowering the

Using fixed count subsample method could have resulted in just one single taxon not

Work

production, and decreased autotrophic production: Keep up the great
cover which may have decreased permeability, increased allochthonous
increased riparian cover. Whatever those humans did (e.g. increased riparian
abundance was likely due to increased riparian cover. As reforestation efforts
sections in the functional feeding group, shredders. Increased shredder
Temporarily of conditions favoring mayflies and stoneflies, particularly
weather quality improved and could have been due to natural variability or

The conclusion of the stream ecologist would also be that it appears that