Changes to MiCorps Stream Monitoring

2021

Introduction

- A presentation for **RETURNING** MiCorps stream program leaders.

- Dr. Paul Steen
  - Huron River Watershed Council and MiCorps; my dual role
  - Changes to my role
  - MiCorps Stream Monitoring Program Manager

- Tamara Lipsey
  - EGLE Aquatic Biologist
  - Taking over as the EGLE representative to MiCorps, replacing Marcy Wilmes-Knoll

Maintenance Grants!

- QAPPS reviewed every two years (invasive species decontamination!)
- $1,000 - $2,000 annually to help you stay involved with MiCorps
- Meant to be very little effort for administration
  - No quarterly reports
  - One final report that is only the financial form and a Fact Sheet

- $20,000 will be normally available; this grant cycle we gave out $30,000. Future years will probably be more competitive.

Changes to Macroinvertebrate Identification and Scoring

Why are changes needed?

IDENTIFICATION AND ASSESSMENT

Use letter codes [**R** (rare) = 1-10, **C** (common) = 11 or more] to record the approximate numbers of organisms in each taxa found in the stream reach.

*** Do NOT count empty shells, pupae, or terrestrial macroinvertebrates***

Group 1: Sensitive

____ Caddisfly larvae (Trichoptera)
EXCEPT Net-spinning caddis
____ Hellgrammites (Megaloptera)
____ Mayfly nymphs (Ephemeroptera)
____ Gilled (right-handed) snails (Gastropoda)
____ Stonefly nymphs (Plecoptera)
____ Water penny (Coleoptera)
____ Water snipe fly (Diptera)

Group 2: Somewhat-Sensitive

____ Alderfly larvae (Megaloptera)
____ Beetle adults (Coleoptera)
____ Beetle larvae (Coleoptera)
____ Black fly larvae (Diptera)
____ Clams (Pelecypoda)
____ Crane fly larvae (Diptera)
____ Crayfish (Decapoda)
____ Damselfly nymphs (Odonata)
____ Dragonfly nymphs (Odonata)
____ Net-spinning caddisfly larvae (Hydropsychidae; Trichoptera)
____ Scuds (Amphipoda)
____ Sowbugs (Isopoda)

Group 3: Tolerant

____ Aquatic worms (Oligochaeta)
____ Leeches (Hirudinea)
____ Midge larvae (Diptera)
____ Pouch snails (Gastropoda)
____ True bugs (Hemiptera)
____ Other true flies (Diptera)

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Total Stream Quality Score = _____
(Sum of totals for groups 1-3; round to nearest whole number)

Check one:
____ Excellent (>48)
____ Good (34-48)
____ Fair (19-33)
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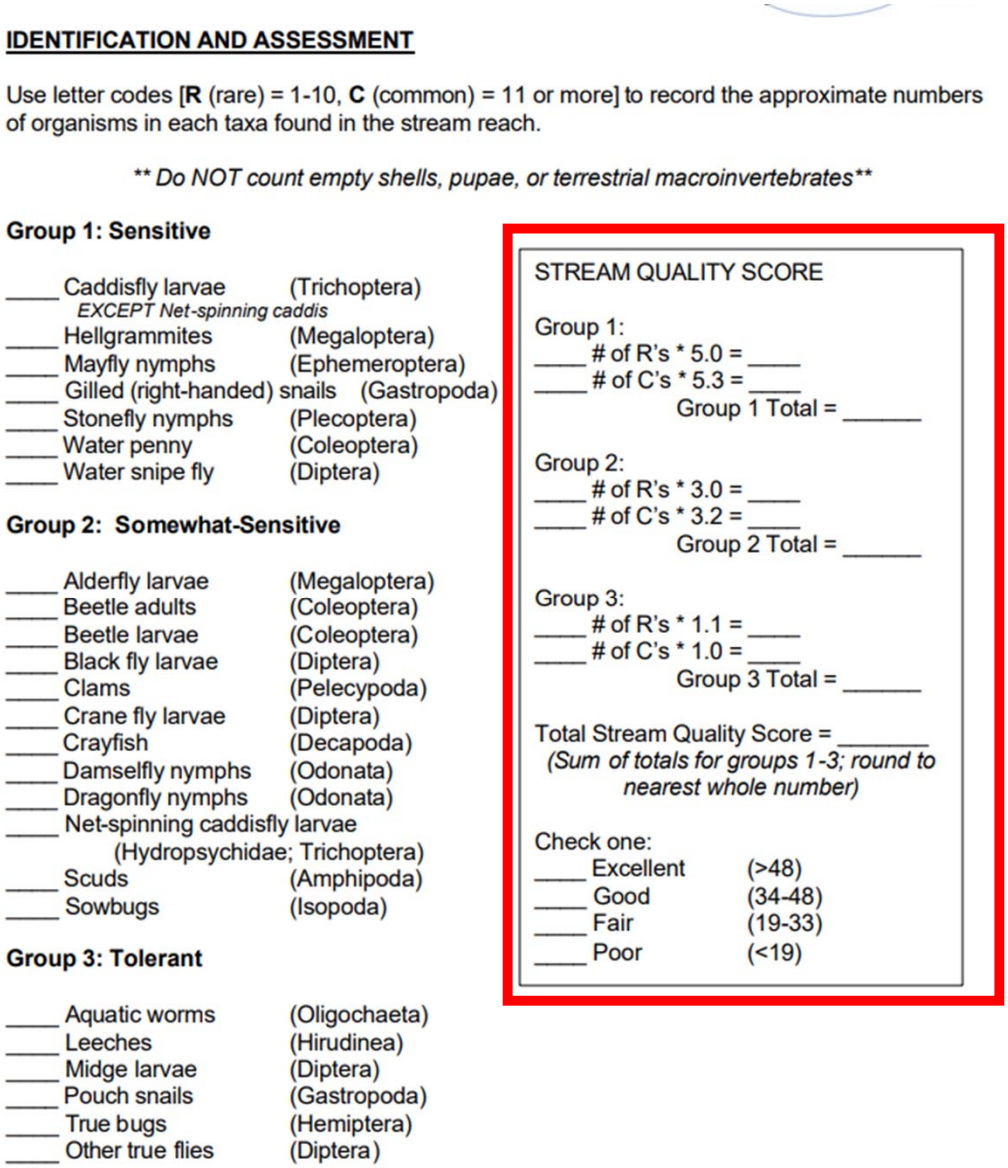
Current Scoring/ID System

- Sensitivity categories are used; organic pollution indicators groups
- The scoring system is divided into fourths from the scale of what is mathematically possible, combined with professional judgment.



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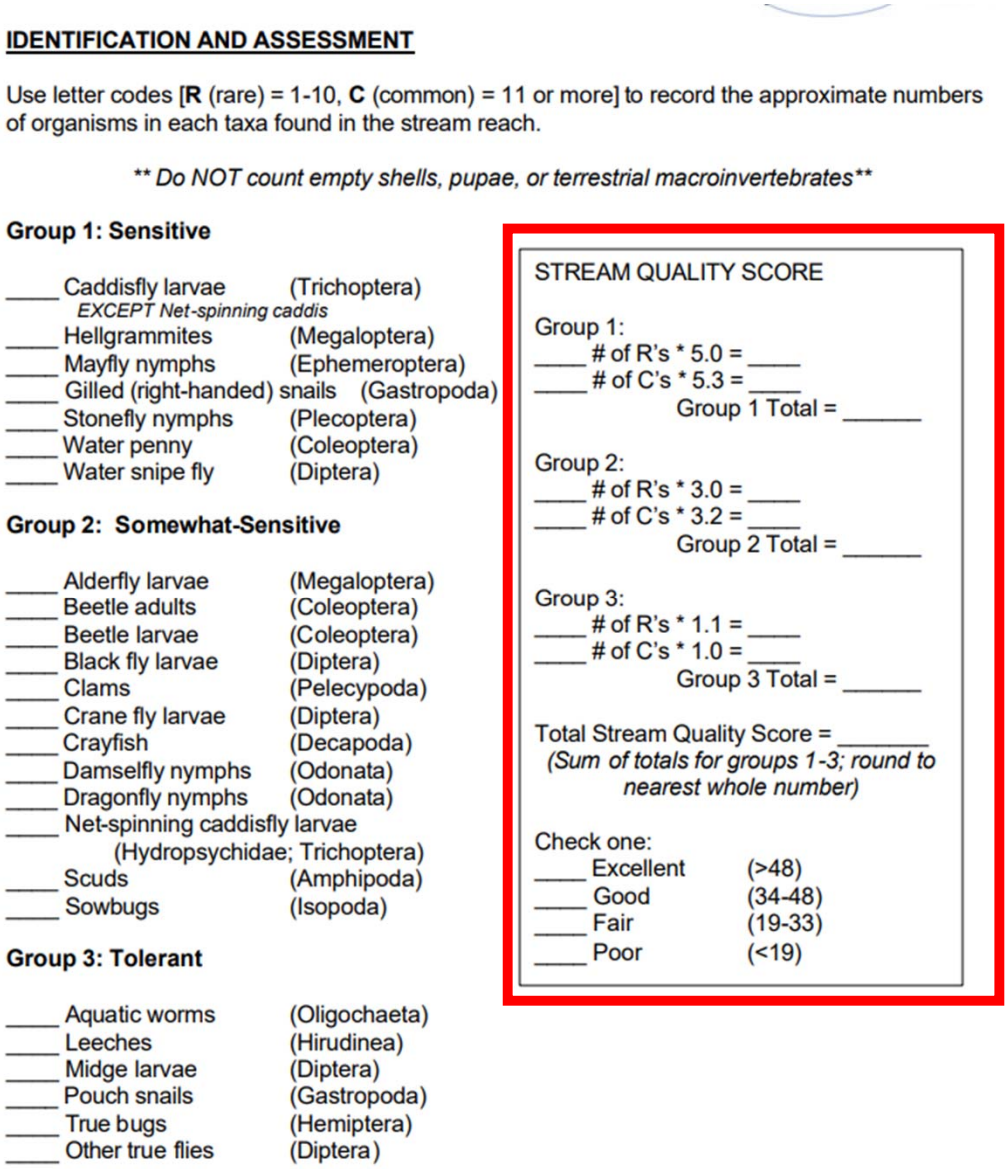
Sensitivity to organic pollution

- Pollution delivered to a stream through both point and non-point method; from natural, agricultural, and urban sources
- Waste-water; fertilizers & nutrients; pesticides
- Strongly connected to oxygen levels

- Secondarily connected to habitat quality and flow
  - Areas with higher organic pollution will have degraded habitat through landuse/development impacts
  - Which brings about more bank erosion; fine sediment; flashy water flows; channelized stream; less riparian cover; less woody debris; less habitat, etc etc

Problems with Current System

- Categories are used when everything is more of a continuous variable in reality (Rare vs Common; Sensitive groupings). Abstraction from reality.
- It is a mathematical scale; not really a scale based on biology.
- There are also some issues with misidentifications– let's find a system that is more resilient against mistaken ID.



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Hilsenhoff Index of Biotic Integrity

- Summary: The current method is a half-acceptance of the Hilsenhoff IBI methods (we do use the sensitive terminology for dividing categories. But the categories are causing inaccuracies)

- Why not go full fledged Hilsenhoff?

- Advantages:
  - Many other researchers, states, universities use this method
  - It is well supported in the scientific literature.

- Let's explore what a Hilsenhoff IBI would look like then in context of Identifying primarily to the Order taxonomic level, to keep this appropriate for volunteers.

- Tolerance Values (0-10) for organic pollution at the Family, Genus, & Species level

HEMIPTERA- True Bugs

	Belostomatidae	10	
	Corixidae	10	
	Gelastocoridae		
	Gerridae	5	
	Hydrometridae		
	Mesoveliidae		
	Naucoridae	5	
	Nepidae	8	
	Notonectidae		
	Pleidae		
	Saldidae	10	
	Veliidae	6	

LEPIDOPTERA- Moths and Butterflies

	Cosmopterigidiae		
	Nepticulidae	5	
	Noctuidae		
	Pyralidae	5	
	Tortricidae		

MEGALOPTERA

	Corydalidae	0	
	Sialidae	4	

ODONATA- Damselflies, Dragonflies

	Aeshnidae	3	
	Calopterygidae	5	
	Coenagrionidae	9	
	Cordulidae	2	
	Cordulegastridae	3	
	Gomphidae	1	
	Lestidae	9	
	Libellulidae	9	
	Macromiidae	3	

PLECOPTERA- Stoneflies

	Capniidae	1	
	Chloroperlidae	1	
	Leuctridae	0	
	Nemouridae	2	
	Perlidae	1	
	Perlodidae	2	
	Pteronarcyidae	0	
	Taeniopterygidae	2	

TRICHOPTERA- Caddisflies

	Apataniidae	3	
	Brachycentridae	1	
	Dipseudopsidae	5	
	Glossosomatidae	1	
	Goeridae	3	
	Helicopsychidae	3	
	Hydropsychidae	4	
	Hydroptilidae	4	
	Lepidostomatidae	3	
	Leptoceridae	4	
	Limnephilidae	4	
	Molannidae	6	
	Odontoceridae	0	
	Philopotamidae	3	
	Phryganeidae	4	
	Polycentropodidae	6	
	Psychomyiidae	2	
	Rhyacophilidae	0	
	Sericostomatidae	3	
	Uenoidae	3	

OTHER GROUPS

	HYDRACARINA Water mites	6	

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3	Caddisfly larvae *EXCEPT Net-spinning caddis*	(Trichoptera)
0	Hellgrammites	(Megaloptera)
3.5	Mayfly nymphs	(Ephemeroptera)
6	Gilled (right-handed) snails	(Gastropoda)
1	Stonefly nymphs	(Plecoptera)
4	Water penny	(Coleoptera)
1	Water snipe fly	(Diptera)

Group 2: Somewhat-Sensitive

4	Alderfly larvae	(Megaloptera)
5	Beetle adults	(Coleoptera)
	Beetle larvae	(Coleoptera)
6	Black fly larvae	(Diptera)
7	Clams	(Pelecypoda)
4	Crane fly larvae	(Diptera)
6	Crayfish	(Decapoda)
	Damselfly nymphs	(Odonata)
	Dragonfly nymphs	(Odonata)

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____ Black fly larvae (Diptera)
____ Clams (Pelecypoda)
____ Crane fly larvae (Diptera)
____ Crayfish (Decapoda)
7.7 Damselfly nymphs (Odonata)
4 Dragonfly nymphs (Odonata)
4 Net-spinning caddisfly larvae (Hydropsychidae; Trichoptera)
4 Scuds (Amphipoda)
8 Sowbugs (Isopoda)

Group 3: Tolerant

10 Aquatic worms (Oligochaeta)
10 Leeches (Hirudinea)
6 Midge larvae (Diptera)
8 Pouch snails (Gastropoda)
7.7 True bugs (Hemiptera)
~~—~~ Other true flies (Diptera)
Huge variety

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Adjustments Needed- Beetles

Water pennies aren't that different from other beetles

Beetles are triple counted in the final score

Solution: We are going to simply have a single beetle line

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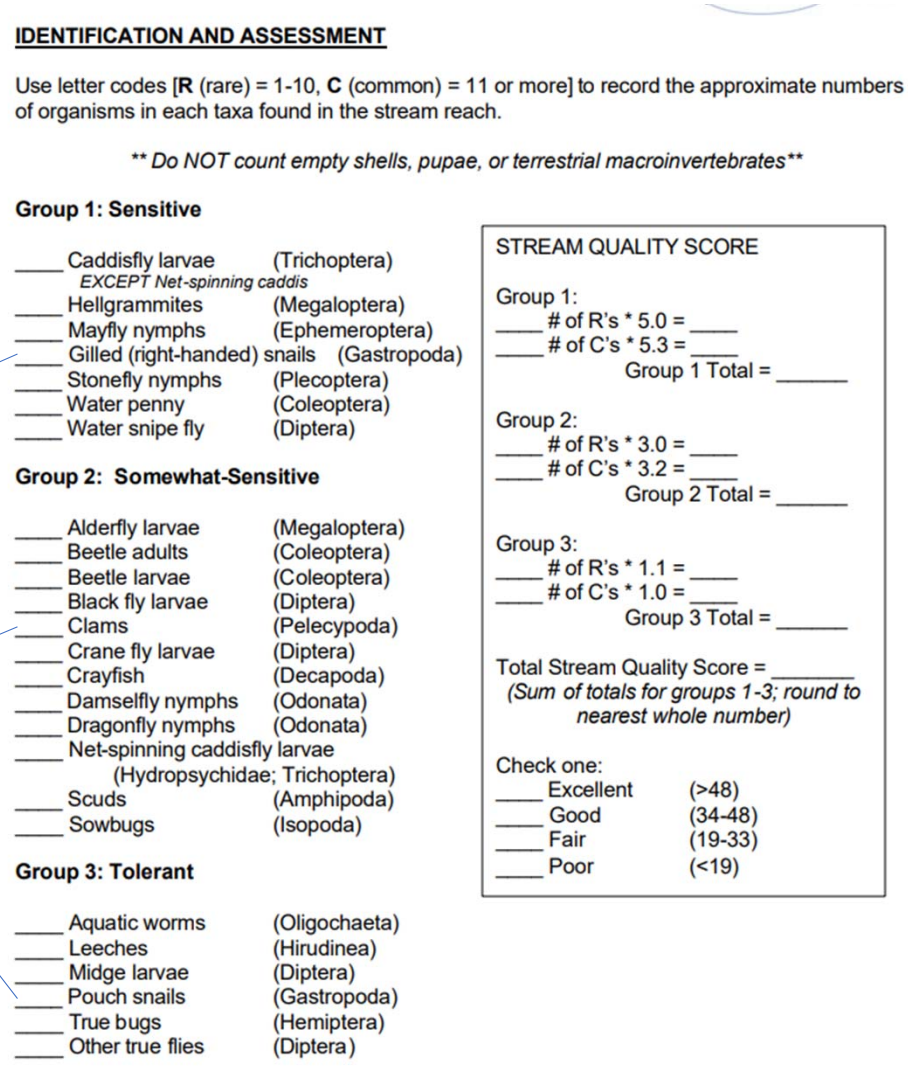
Adjustments-Mollusks

There are 10 possible snail families in Michigan, ranging from tolerance 6 through 8.

So while some snails are more pollution tolerant than others, it is not a huge difference; not worth teaching people the difference (from a score perspective at least).

Bivalves also fall into this tolerance range: 6-8

Solution: Mollusks are super cool but not really from a WQ detection perspective. One line for mollusks with an average score of 6.9.



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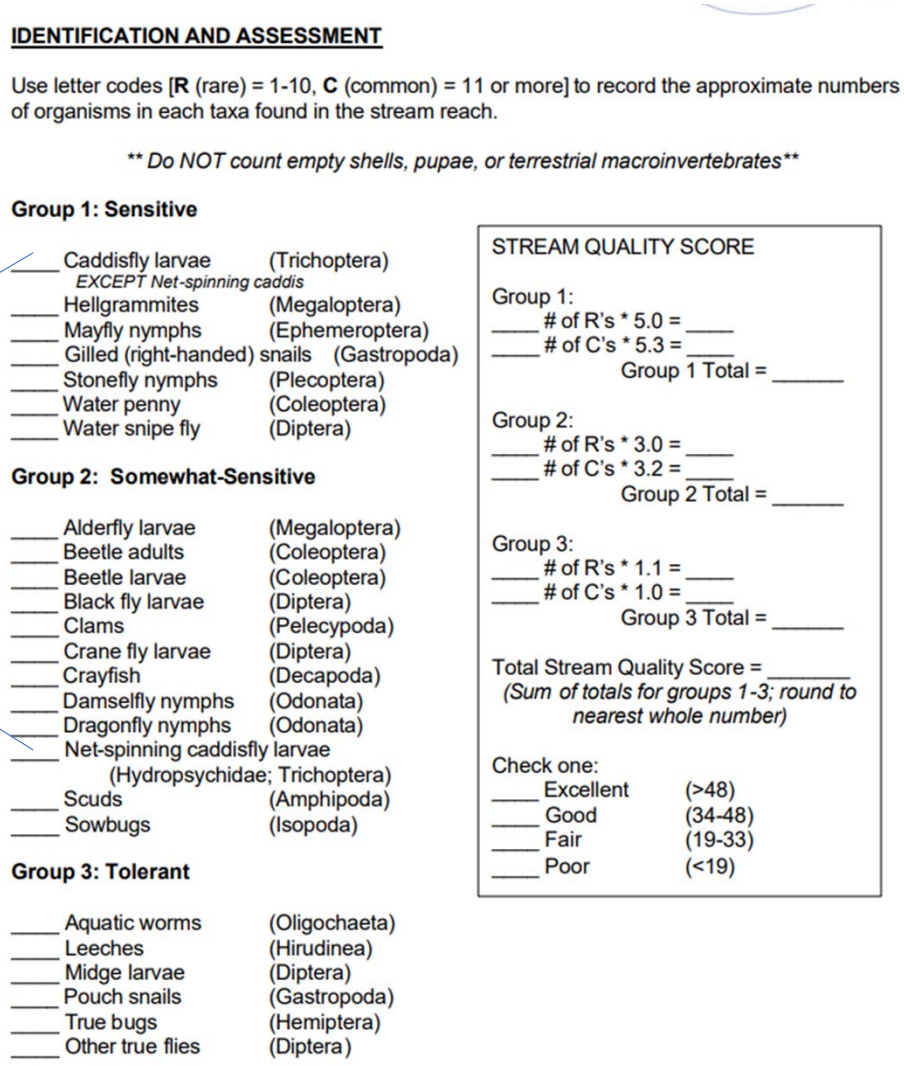
Adjustments-Caddisflies

The average of Caddisflies is a 3.0

Hydropsychids are rated at 4.0

There are three other free living caddisflies that are very easy to confuse with Hydropsychids

Solution: All caddisflies are given a single line with a score of 3.2



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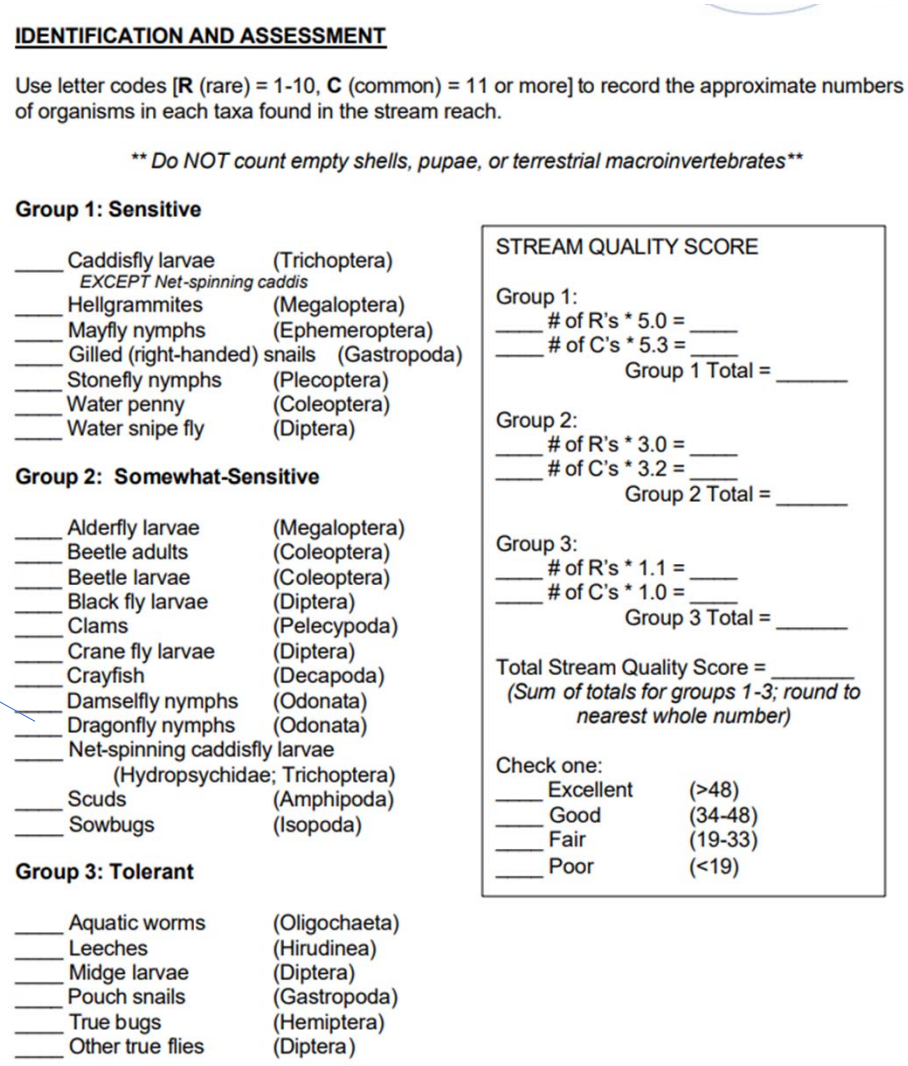
Adjustments-Gomphidae

Gomphidae (clubtails) dragonsflies have a tolerance value of 1,
which is the same as a stonefly.

Other dragonflies are rated between 2-9.

It is hard to tell the difference between a Cordulidae (tolerance value 2) and a Libellulidae (tolerance value 9).

Solution: Gomphid dragonflies are very easy to ID without scopes. Split dragonflies into two categories, Gomphids (clubtails) and all the others (with an average tolerance of 4.0). Obviously, identification at the family level is the best.



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Adjustments

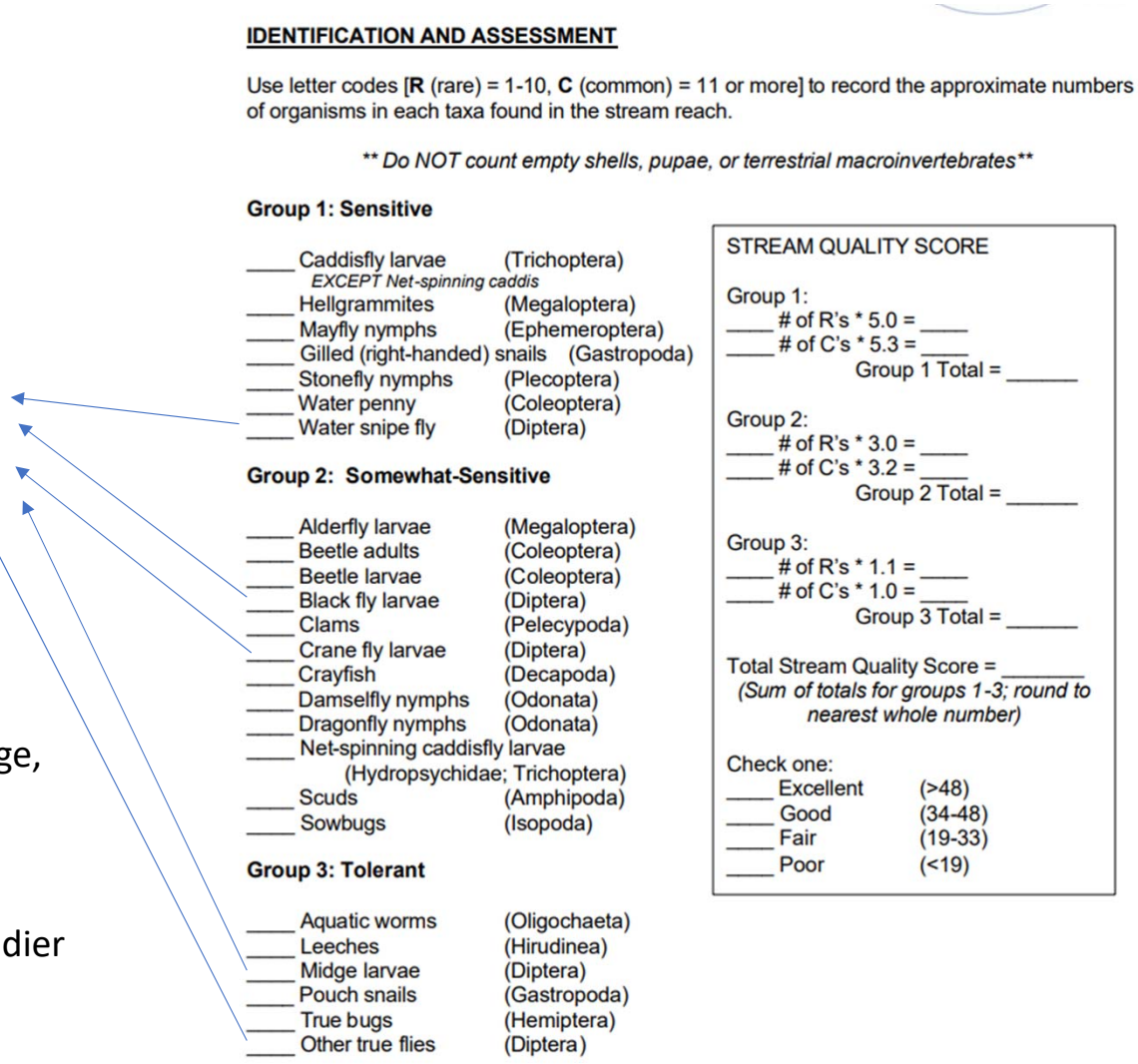
Dipterans. 👎

- They were problematic in the old system and will be a problem in the new system.
- Tremendously diverse tolerance values.

Solution: Three lines for Dipterans

- Sensitive True Flies (water snipe fly, netwinged midge, dixid midge) are rated 1.0
- Somewhat Sensitive True Flies (those not listed elsewhere) are rated 6.0
- Tolerant True Flies (mosquito, rat-tailed maggot, soldier fly) are rated 8.7

The new system will be more biologically accurate; identification will still be challenging for new-comers. But I don't think it will be harder than it was before.



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____ # of C's * 3.2 = ____
Group 2 Total = _____

Group 3:
____ # of R's * 1.1 = ____
____ # of C's * 1.0 = ____
Group 3 Total = _____

Total Stream Quality Score = _____
(Sum of totals for groups 1-3; round to nearest whole number)

Check one:
____ Excellent (>48)
____ Good (34-48)
____ Fair (19-33)
____ Poor (<19)

...Corps Site ID#:_____

Water Corps

IDENTIFICATION AND ASSESSMENT

*** Do NOT count empty shells, pupae, or terrestrial macroinvertebrates***
Taxa are listed from most pollution sensitive to most pollution tolerant

Count	Common Name	Scientific Taxa	Sensitivity Rating (0-10)	Count x Sensitivity
	Helgrammite (Dobsonfly)	Megaloptera, Corydalidae	0.0	
	Clubtail Dragonfly	Odonata, Gomphidae	1.0	
	Sensitive True Flies (water snipe fly,net-winged midge, dixid midge)	Athericidae, Blephariceridae, Dixidae,	1.0	
	Stonefly	Plecoptera	1.3	
	Caddisfly	Trichoptera	3.2	
	Mayfly	Ephemeroptera	3.5	
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
	Beetle	Coleoptera	5.1	
	Somewhat Sensitive True Flies	Dipterans (those not listed elsewhere)	6.0	
	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
	Damselfly	Odonata	7.7	
	Sowbug	Isopoda	8.0	
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphridae, Stratiomyidae	8.7	
	Leech	Hirundinae	10.0	
	Aquatic Worm	Oligochaeta	10.0	

	Total Abundance		**Sum of (Count x Sensitivity):**	

First: If your total abundance is
Less than 30 → Automatically give it a WQR of 10 (Very Poor rating)
Less than 60 → Automatically give it a WQR of 7 (Poor rating)

Water Quality Rating		Degree of Organic Pollution
0.0-3.50	excellent	Pollution unlikely
3.51-4.50	very good	Slight pollution possible
4.51-5.50	good	Some pollution possible
5.51-6.50	fair	Fairly substantial pollution likely
6.51-7.50	fairly poor	Substantial pollution likely
7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

= _____

Water Corps

IDENTIFICATION AND ASSESSMENT

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****Taxa are listed from most pollution sensitive to most pollution tolerant****

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	Stonefly	Plecoptera	1.3	
	Caddisfly	Trichoptera	3.2	
	Mayfly	Ephemeroptera	3.5	
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
	Beetle	Coleoptera	5.1	
	Somewhat Sensitive True Flies	Dipterans (those not listed elsewhere)	6.0	
	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
	Damselfly	Odonata	7.7	
	Sowbug	Isopoda	8.0	
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphridae, Stratiomyidae	8.7	
	Leech	Hirundinae	10.0	
	Aquatic Worm	Oligochaeta	10.0	

	Total Abundance		Sum of (Count x Sensitivity):	

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7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

= _____

Hilsenhoff IBI is supposed to be done with a total abundance of at least 100.

What if your volunteers don't find that number?

Based on personal experience (& confirmed by Gary Kolhepp and Marcy Wilmes):

< 30 -- these are the worst of the worst samples. If you can't get 30 bugs in an hour's work, the stream is heavily degraded. Score a 10.

< 60 -- Certainly a problematic stream that should not be given a good score. Score a 7.

60-100 – No penalty, but always strive to get over 100 insects at site.

...Corps Site ID#:_____

Water Corps

IDENTIFICATION AND ASSESSMENT

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	Stonefly	Plecoptera	1.3	
35	Caddisfly	Trichoptera	3.2	
15	Mayfly	Ephemeroptera	3.5	
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
6	Beetle	Coleoptera	5.1	
	Somewhat Sensitive True Flies	Dipterans (those not listed elsewhere)	6.0	
	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
15	Damselfly	Odonata	7.7	
	Sowbug	Isopoda	8.0	
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphridae, Stratiomyidae	8.7	
3	Leech	Hirundinae	10.0	
	Aquatic Worm	Oligochaeta	10.0	

75	**Total Abundance**	**Sum of (Count x Sensitivity):**	

First: If your total abundance is
Less than 30 → Automatically give it a WQR of 10 (Very Poor rating)
Less than 60 → Automatically give it a WQR of 7 (Poor rating)

Water Quality Rating		Degree of Organic Pollution
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6.51-7.50	fairly poor	Substantial pollution likely
7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

= _____

1. Add Total Abundance.

...Corps Site ID#:_____

Water Corps

IDENTIFICATION AND ASSESSMENT

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****Taxa are listed from most pollution sensitive to most pollution tolerant****

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	Clubtail Dragonfly	Odonata, Gomphidae	1.0	
	Sensitive True Flies (water snipe fly,net-winged midge, dixid midge)	Athericidae, Blephariceridae, Dixidae,	1.0	
	Stonefly	Plecoptera	1.3	
35	Caddisfly	Trichoptera	3.2	112
15	Mayfly	Ephemeroptera	3.5	52.5
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
6	Beetle	Coleoptera	5.1	25.5
	Somewhat Sensitive True Flies	Dipterans (those not listed elsewhere)	6.0	
	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
15	Damselfly	Odonata	7.7	115.5
	Sowbug	Isopoda	8.0	
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphridae, Stratiomyidae	8.7	
3	Leech	Hirundinae	10.0	30
	Aquatic Worm	Oligochaeta	10.0	

75	**Total Abundance**	**Sum of (Count x Sensitivity):**	

First: If your total abundance is
Less than 30 → Automatically give it a WQR of 10 (Very Poor rating)
Less than 60 → Automatically give it a WQR of 7 (Poor rating)

Water Quality Rating		Degree of Organic Pollution
0.0-3.50	excellent	Pollution unlikely
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7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

= _____

1. Add Total Abundance.

2. Multiply: Count x Sensitivity for each line

...Corps Site ID#:_____

Water Corps

IDENTIFICATION AND ASSESSMENT

*** Do NOT count empty shells, pupae, or terrestrial macroinvertebrates****
****Taxa are listed from most pollution sensitive to most pollution tolerant****

Count	Common Name	Scientific Taxa	Sensitivity Rating (0-10)	Count x Sensitivity
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	Stonefly	Plecoptera	1.3	
35	Caddisfly	Trichoptera	3.2	112
15	Mayfly	Ephemeroptera	3.5	52.5
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
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	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
15	Damselfly	Odonata	7.7	115.5
	Sowbug	Isopoda	8.0	
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphridae, Stratiomyidae	8.7	
3	Leech	Hirundinae	10.0	30
	Aquatic Worm	Oligochaeta	10.0	

75	**Total Abundance**	**Sum of (Count x Sensitivity):**	**335.5**

First: If your total abundance is
Less than 30 → Automatically give it a WQR of 10 (Very Poor rating)
Less than 60 → Automatically give it a WQR of 7 (Poor rating)

Water Quality Rating		Degree of Organic Pollution
0.0-3.50	excellent	Pollution unlikely
3.51-4.50	very good	Slight pollution possible
4.51-5.50	good	Some pollution possible
5.51-6.50	fair	Fairly substantial pollution likely
6.51-7.50	fairly poor	Substantial pollution likely
7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

= _____

1. Add Total Abundance.
2. Multiply: Count x Sensitivity for each line
3. Sum the Count x Sensitivity Column

...Corps Site ID#:_____

Water Corps

IDENTIFICATION AND ASSESSMENT

*** Do NOT count empty shells, pupae, or terrestrial macroinvertebrates****
****Taxa are listed from most pollution sensitive to most pollution tolerant****

Count	Common Name	Scientific Taxa	Sensitivity Rating (0-10)	Count x Sensitivity
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	Clubtail Dragonfly	Odonata, Gomphidae	1.0	
	Sensitive True Flies (water snipe fly,net-winged midge, dixid midge)	Athericidae, Blephariceridae, Dixidae,	1.0	
	Stonefly	Plecoptera	1.3	
35	Caddisfly	Trichoptera	3.2	112
15	Mayfly	Ephemeroptera	3.5	52.5
	Alderfly	Megaloptera, Sialidae	4.0	
	Scud	Amphipoda	4.0	
	Dragonfly	Odonata	4.0	
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	Crayfish	Decapoda	6.0	
	Bivalves/Snails	Pelecypoda, Gastropoda	6.9	
	True Bug	Hemiptera	7.7	
15	Damselfly	Odonata	7.7	115.5
	Sowbug	Isopoda	8.0	
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3	Leech	Hirundinae	10.0	30
	Aquatic Worm	Oligochaeta	10.0	

75	**Total Abundance**	**Sum of (Count x Sensitivity):**	**335.5**

First: If your total abundance is
Less than 30 → Automatically give it a WQR of 10 (Very Poor rating)
Less than 60 → Automatically give it a WQR of 7 (Poor rating)

Water Quality Rating		Degree of Organic Pollution
0.0-3.50	excellent	Pollution unlikely
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4.51-5.50	good	Some pollution possible
5.51-6.50	fair	Fairly substantial pollution likely
6.51-7.50	fairly poor	Substantial pollution likely
7.51-8.50	poor	Very substantial pollution likely
8.51-10.0	very poor	Severe pollution likely

Water Quality Rating =

Sum of (Count x Sensitivity)
Divided By
Total Abundance

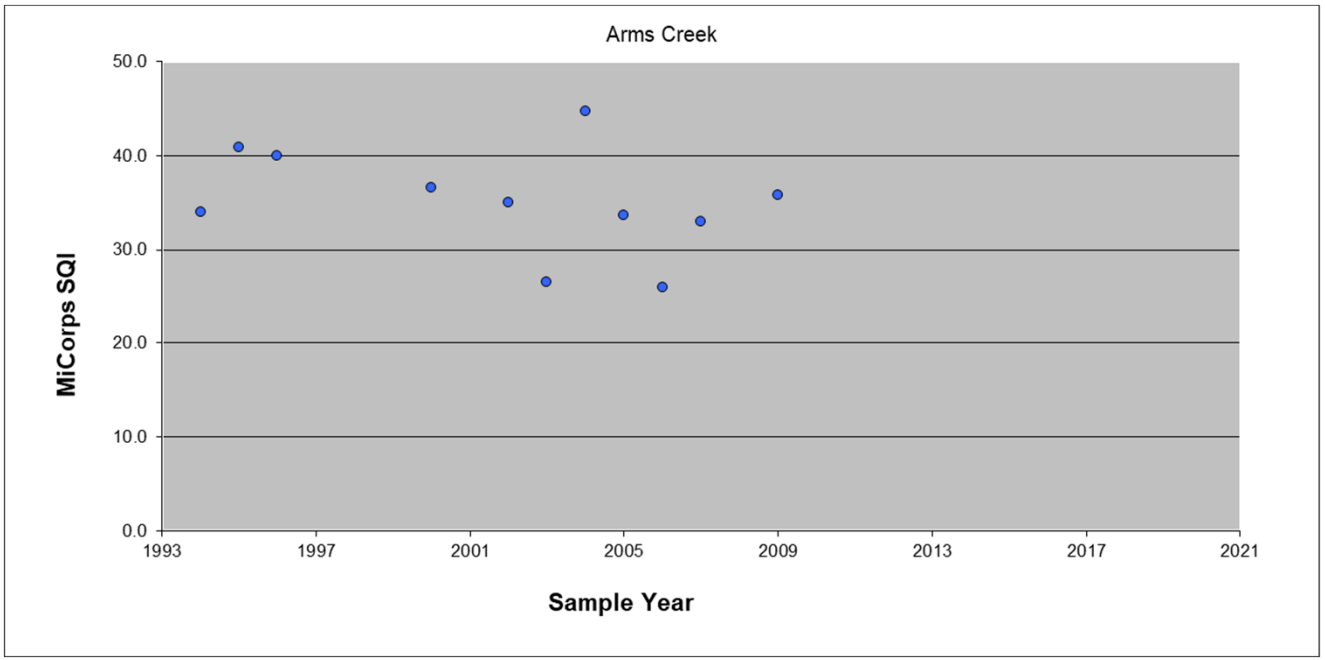
= **4.47**

1. Add Total Abundance.
2. Multiply: Count x Sensitivity for each line
3. Sum the Count x Sensitivity Column
4. Divide that Sum by the Total Abundance

Conversion from the Old System to the New

The problem:

The old system and the new system aren't 100% equivalent, so what about long term trends?



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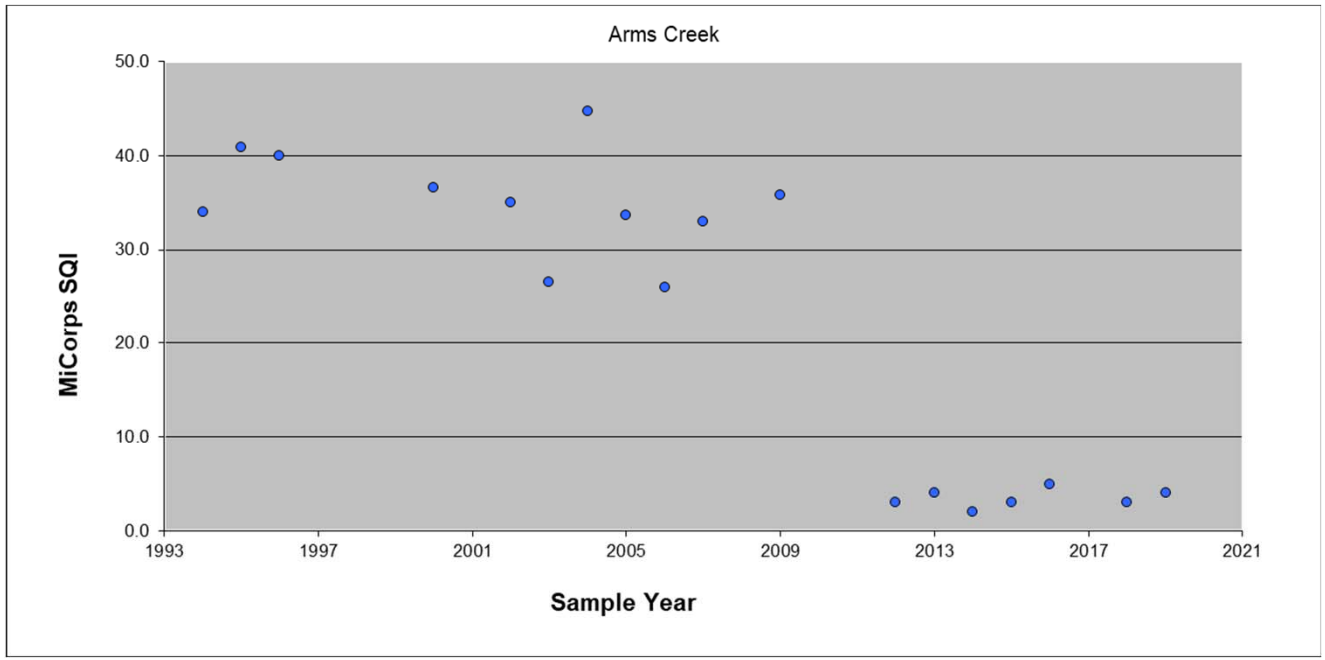


Conversion from the Old System to the New

Option 1:

- If you always identified down to the **Family level**, this change only helps you.
  - The old scoring system didn't even have Scoring for the family level. The new scoring system works great with Family level data. See the new Family level data sheet.
  - Go back to your old data and create scores using the family level tolerance values; plot out long term trends.

Conversion from the Old System to the New

Option 2: Re-identify and Re-score

- Remember how I always tell you to keep your old samples?
- A great option if you have less than 5 years of data, or few sites. Spend a few days to re-identify and re-score your samples. (Ask volunteers)
- Ultimately up to you in how much work you want to put in to do this.

Conversion from the Old System to the New

Option 3:

Going forward, use both methods for 3-5 years and then phase out the old method after new baseline data is established.

- I made up a transition datasheet you are welcome to use. (micorps.net →stream documents)
- This way you will still be able to watch for trends during the overlap period.
- Would make for an interesting MiCorps conference talk in the future (comparing scores, looking for trends in both methods).

Transition data sheet

MACROINVERTEBRATE ID TRANSITION DATASHEET:

This datasheet contains all of the line items for both the new MiCorps ID scheme and the legacy ID scheme. If you fill this out during your identification, you will be able to transfer the information to both of those datasheets and score your sample using both methodologies.

Count	Common Name	Scientific Taxa
	Helgrammite (Dobsonfly)	Megaloptera, Corydalidae
	Stonefly	Plecoptera
	Mayfly	Ephemeroptera
	Alderfly	Megaloptera, Sialidae
	True Bug	Hemiptera
	Damselfly	*Odonata*
	Crayfish	Decapoda
	Scud	Amphipoda
	Sowbug	Isopoda
	Leech	Hirundinae
	Aquatic Worm	Oligochaeta

Beetles; Coleoptera

	Water pennies	Coleoptera, Psephenidae
	Beetle adults	Coleoptera
	Beetle adults	Coleoptera

Caddisfly; Trichoptera

	Net spinning caddisfly	Hydropsychidae
	All other caddisflies	

True flies; dipterans

Count	Common Name	Scientific Taxa
	Black Flies	Simuliidae
	Crane Flies	Tipulidae
	Midges	Chironomidae
	Watersnipe Flies	Athericidae
	Tolerant True Fly (mosquito, rat-tailed maggot, soldier fly)	Cuclidae, Syphidae, Stratiomyidae
	Sensitive True Flies (net-winged midge, dixid midge)	Blephariceridae, Dixidae,
	Other True Flies (any dipterans not listed above)	

Dragonflies; Odonata-Anisoptera

	Clubtail Dragonflies	Gomphidae
	All other Dragonflies	

Bivalves and Snails; Mollusks

	Clams	
	Gilled (Right-handed) snails	
	Pouch snails (Left-handed) snails	

Conversion from the Old System to the New

Option 4: Tried it, can't recommend it

Rescale your old SQI scores:

Ranking	Old System (SQI)	New System (WQR)
Border of Excellent-Good	48	3.5
Border of Good-Fair	34	5.5
Border of Fair-Poor	19	7.5
Worst Score Possible	0	10.0

$$WQR = (0.135 \times SQI - 10) \times -1$$

Conversion from the Old System to the New

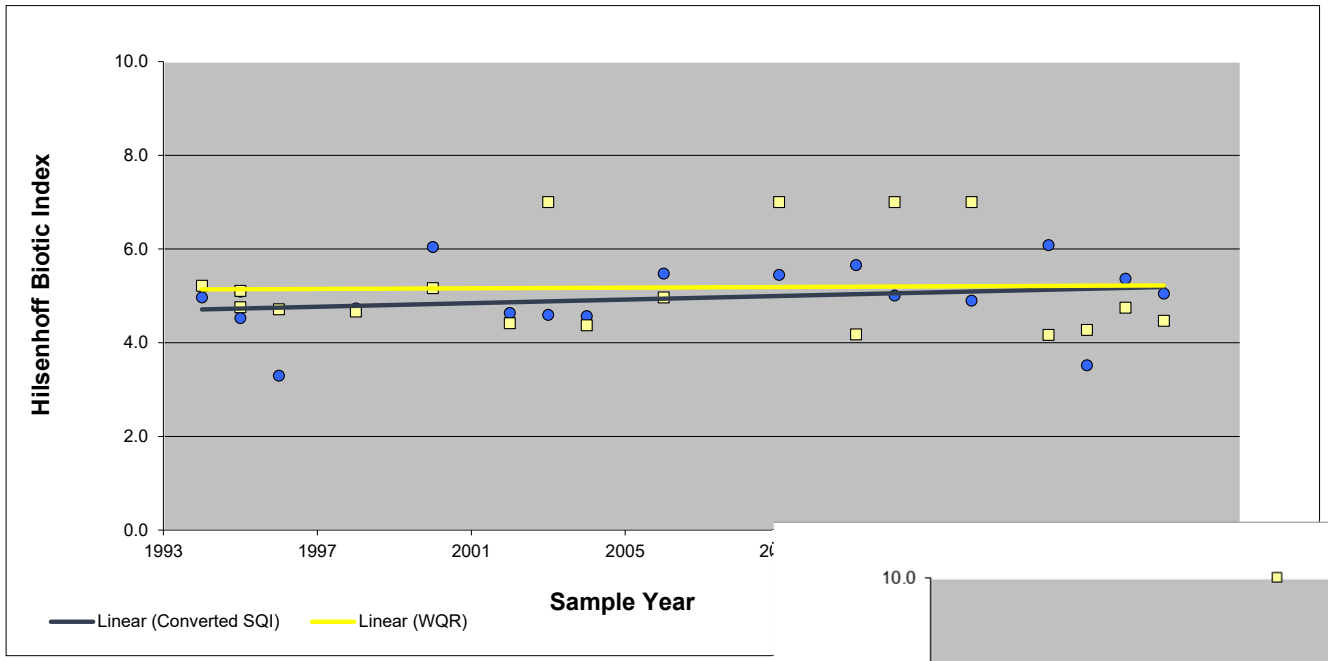
Option 3:

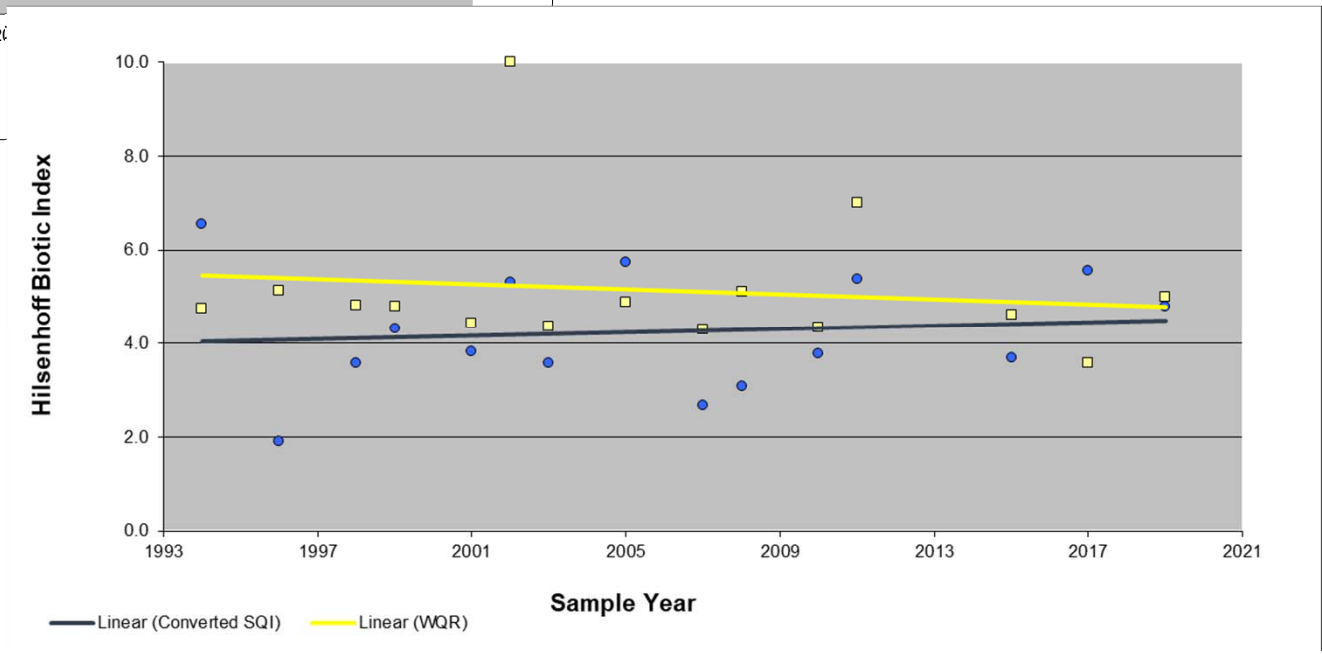
Rescale your old SQI scores.

N=1542, all past HRWC data
Correlation: 0.52

WQR = (0.135 x SQI – 10) x -1

Site	Year	Month	SQI	converted SQI	WQR
1	1994	4	34.0	5.4	4.54
1	1995	4	40.9	4.5	4.35
1	1996	4	40.0	4.6	5.34
1	2000	4	36.6	5.1	4.77
1	2002	4	35.0	5.3	7.00
1	2003	4	26.6	6.4	7.00
1	2004	4	44.7	4.0	5.01
1	2005	4	33.7	5.5	4.43
1	2006	4	26.0	6.5	7.00
1	2007	4	33.0	5.5	10.00
1	2009	4	35.8	5.2	3.59
1	2012	4	36.4	5.1	4.60
1	2013	4	29.0	6.1	7.00
1	2014	4	33.5	5.5	5.26
1	2015	4	38.0	4.9	4.35
1	2016	4	17.3	7.7	7.00
1	2018	4	44.0	4.1	4.48
1	2019	4	24.7	6.7	4.24
1	1994	9	48.3	3.5	4.28
1	1995	9	35.6	5.2	4.76
1	1996	9	48.6	3.4	4.71
1	1998	9	38.2	4.8	4.67
1	2000	9	28.7	6.1	5.16
1	2002	9	38.9	4.7	4.42
1	2003	9	39.2	4.7	7.00
1	2004	9	39.4	4.7	4.37
1	2006	9	32.8	5.6	4.96
1	2018	9	33.6	5.5	4.75
1	2009	10	33.0	5.5	7.00
1	2011	10	31.5	5.7	4.18
1	2012	10	36.1	5.1	7.00


Hilsenhoff Biotic Index
10.0
8.0
6.0
4.0
2.0
0.0
1993
1997
2001
2005
Sample Year
Linear (Converted SQI)
Linear (WQR)


Hilsenhoff Biotic Index
10.0
8.0
6.0
4.0
2.0
0.0
1993
1997
2001
2005
2009
2013
2017
2021
Sample Year
Linear (Converted SQI)
Linear (WQR)

Wrap up

Summary: I'm not doing this to create more work for you;

- It is easier to see where the score is coming from and what it means.
- It is similar to what other organizations do and has a backing in the scientific literature
- More useful results for management purposes.
- I'm still trying to figure out conversion of old data; but best option is to rescore old samples; and feel free to try things out yourself.

Data entry

- The whole MiCorps database is going to be restructured over the next few years.
- We don't have a data entry form yet for the new method.
- Just hold onto your data for now.

- Get your results into your yearly fact sheet, and make sure you share it with the EGLE biologists and other partners/ stakeholders in your watershed. Template available at MiCorps website under stream documents.