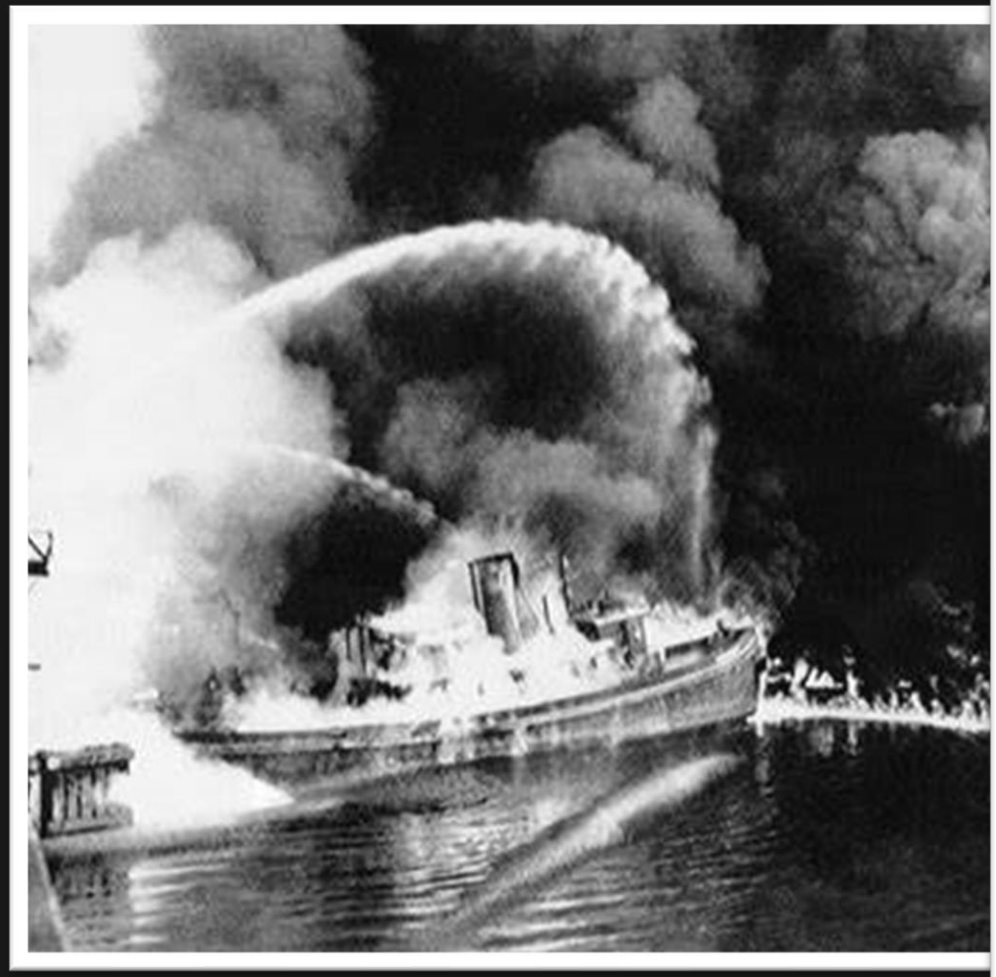
It's in our Nature.

naturalareas.ohiodnr.gov

SCENIC RIVERS

1. Scenic Rivers: Who are we?
2. Sampling Protocols
3. Bug Identification
4. Discussion & Questions

SCENIC RIVERS



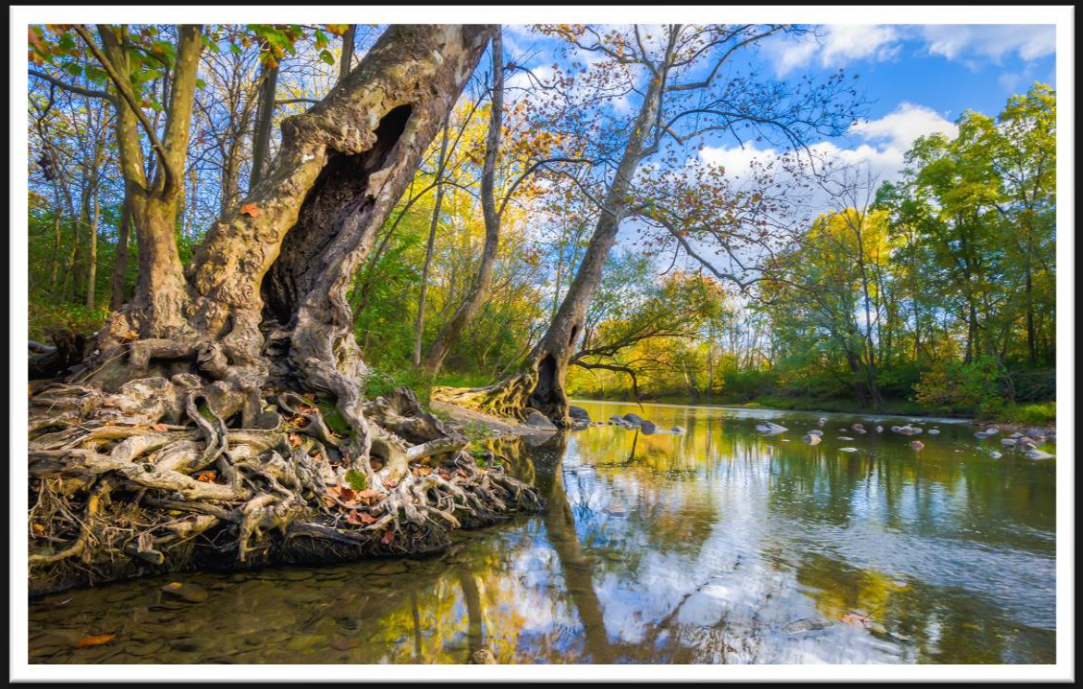
SCENIC RIVERS

VS

Kokosing River

SCENIC RIVERS

Scenic Rivers Act of 1968



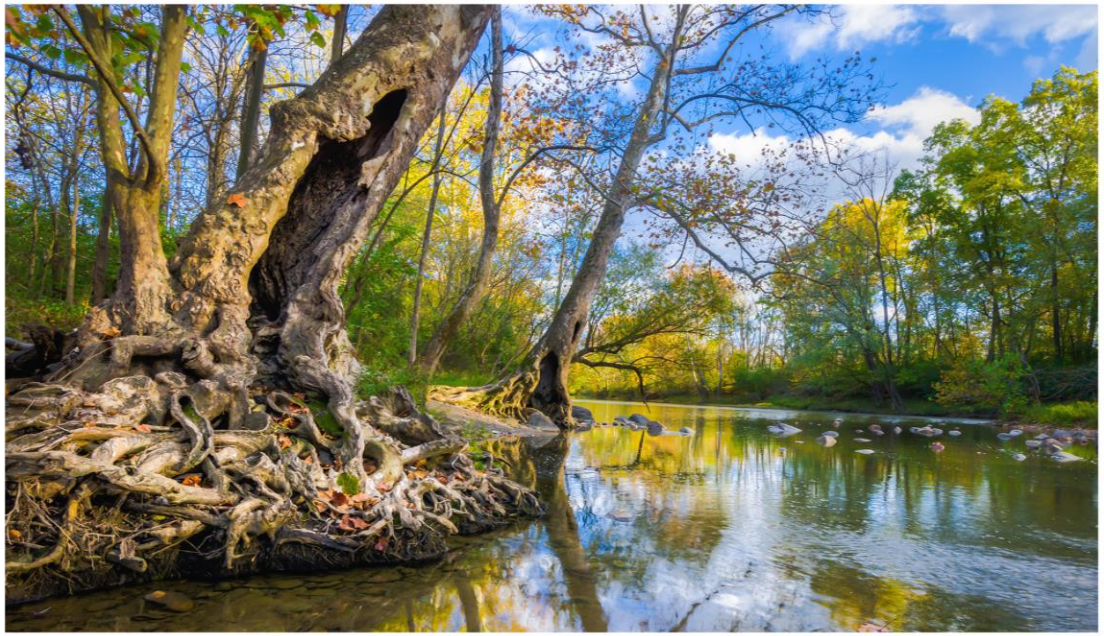
SCENIC RIVERS

Mission:

To work with local communities to protect Ohio's highest quality streams for present and future generations

SCENIC RIVERS

1. Community Involvement
2. Project Reviews
3. Education
4. Land Management
   & Riparian Protection
5. Stream Health Assessments

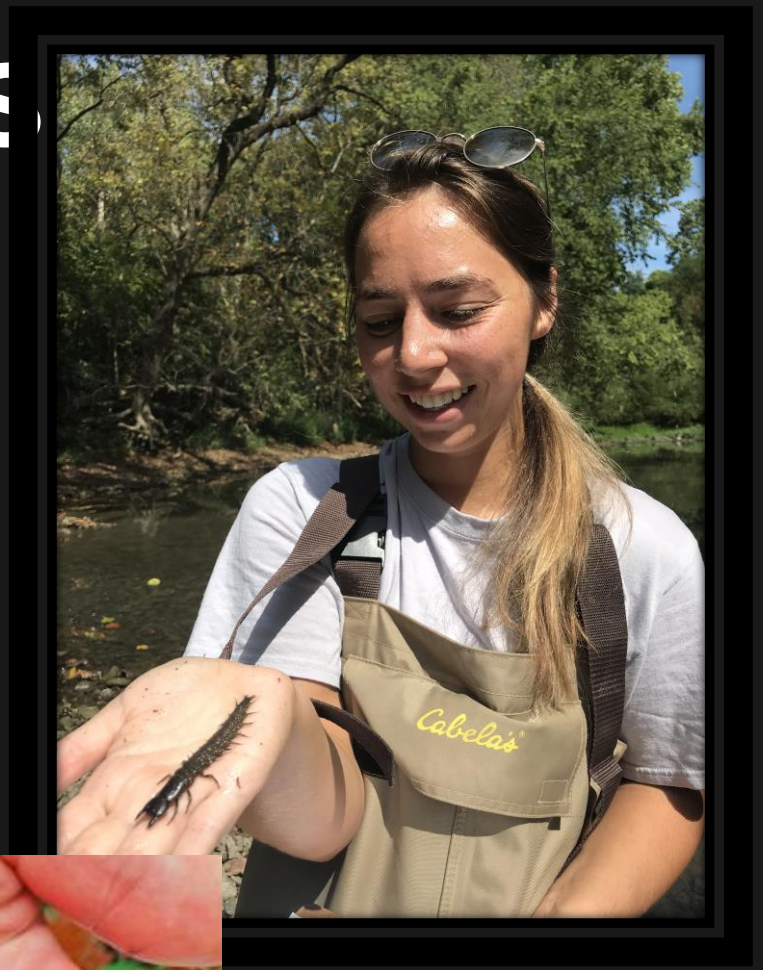


Stream Quality Monitoring: 1983

MACROINVERTEBRATES

?

Macro



Invertebrate

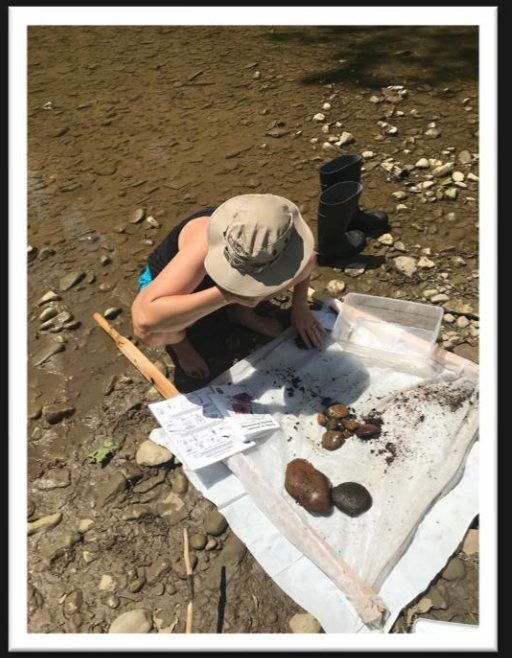
WHY MACROS?

Sensitive and Long Lived

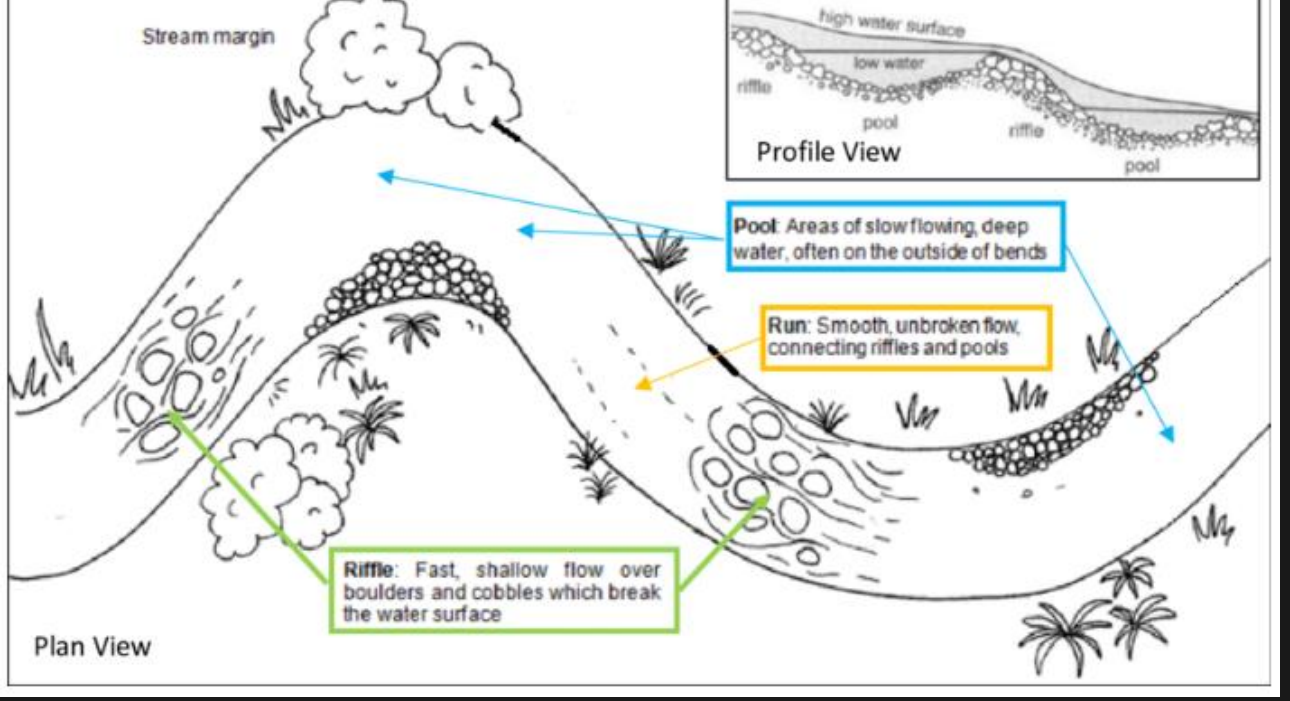
- Chemicals
- Oxygen Saturation
- Heat
- Sediment

HOW DO WE MEASURE MACROS?

- Low Cost
- Easy Identification and Training
- Sensitive Critters



KICK SEINE



WHERE?

- **The Riffle!**

THE INDEX

- Presence or Absence.... Not abundance!

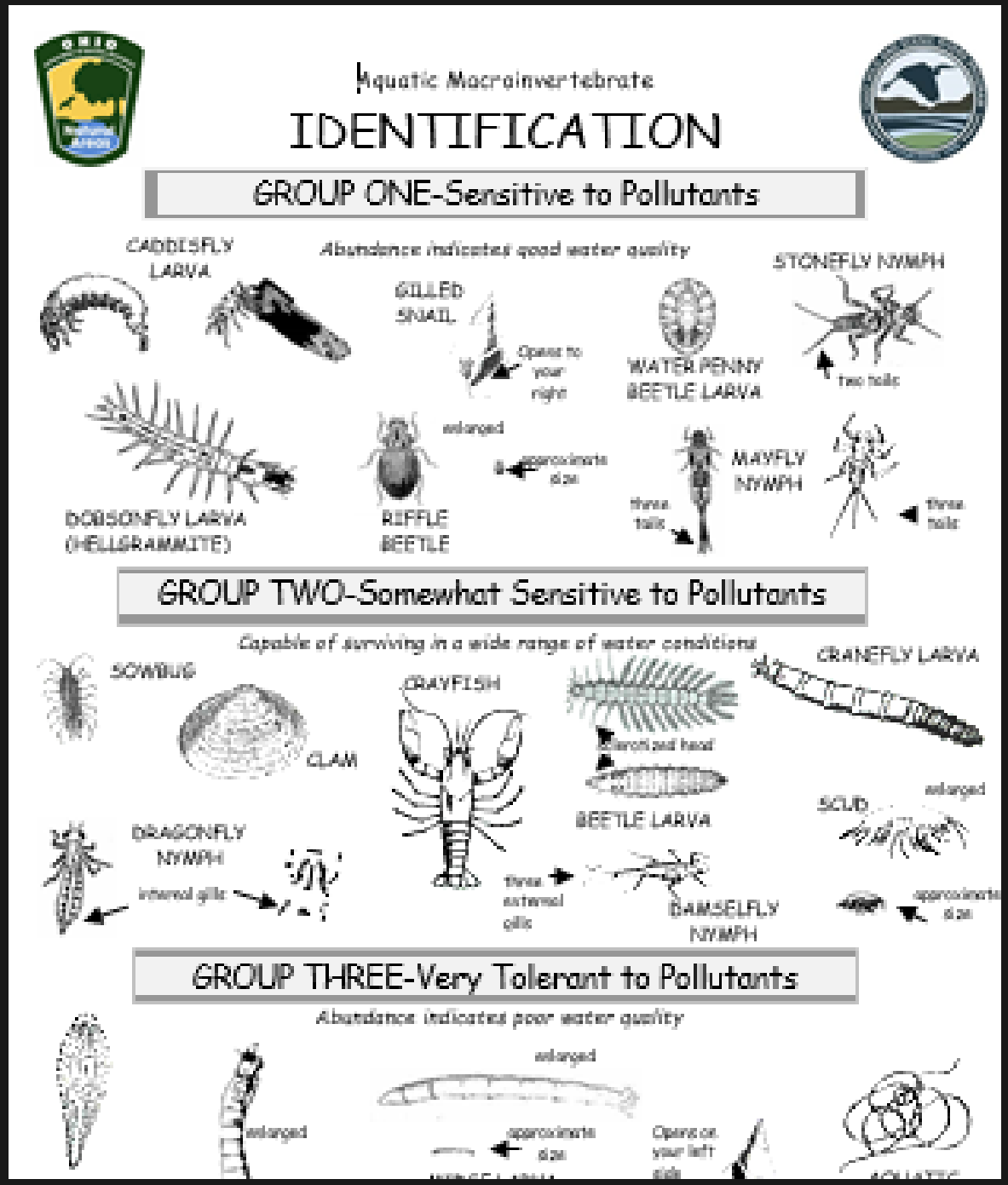
Cumulative Index Value (CIV):	0
Stream Quality Assessment Rating:	
☐ CIV > 22 (Excellent)	
☐ CIV 17-22 (Good)	
☐ CIV 11-16 (Fair)	
☐ CIV < 11 (Poor)	

- Diversity is Key!

3

2

1



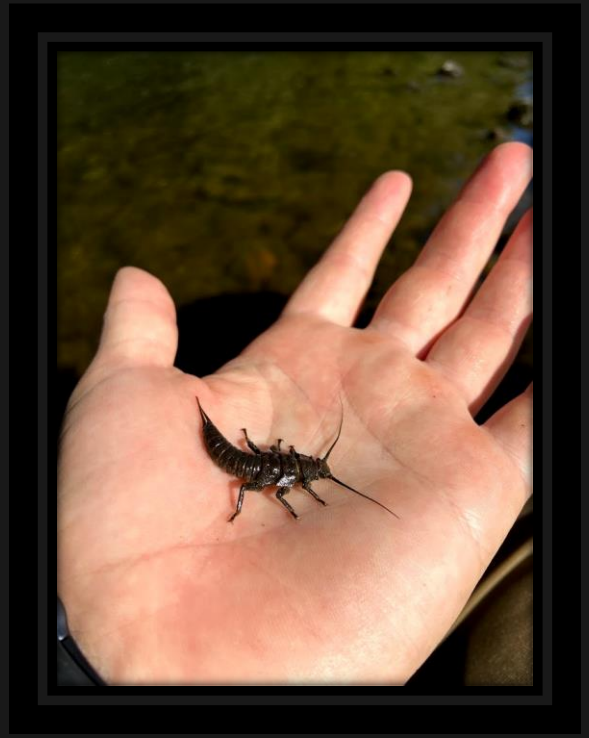
LOTS OF DATA.... OR IS IT?

160,000+ Participants
17,000+ Samples

CREDIBLE DATA LAW

- 2003
- “Good scientific information”
- State uses data to manage surface water

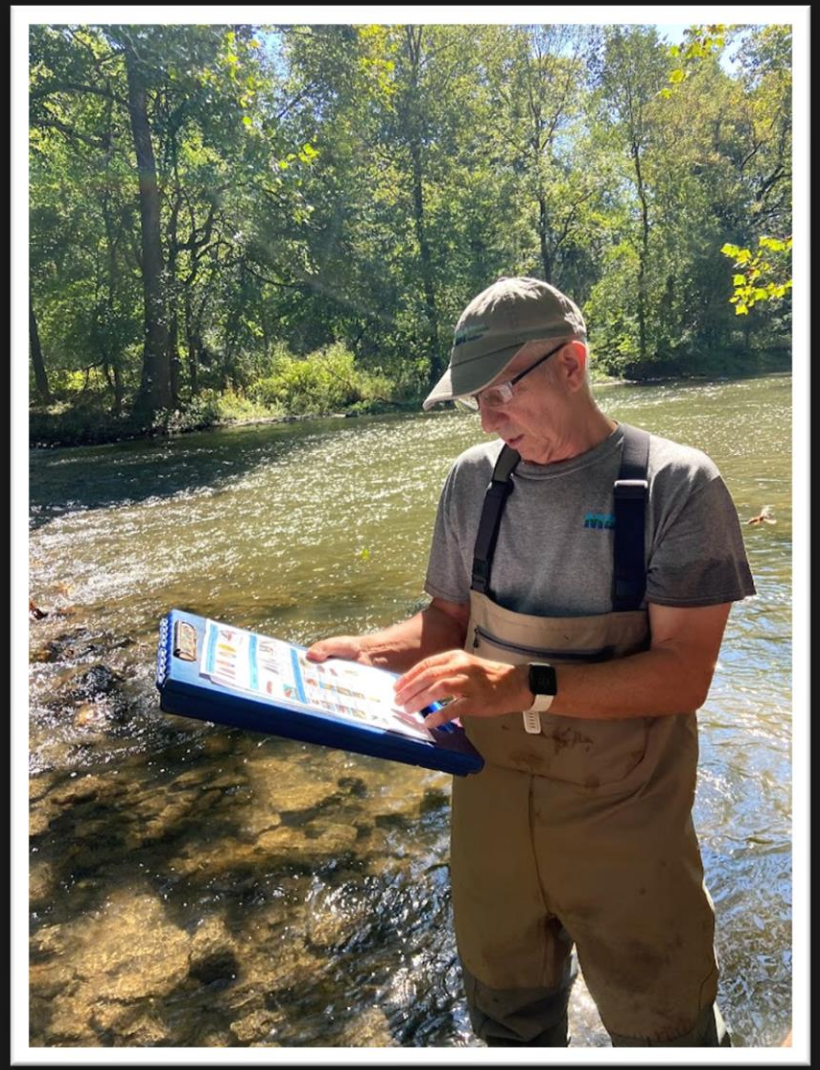
LEVEL 1



“Project designed for public awareness and/or educational purposes”

LEVEL 3

- Regulatory
- “Highest level of scientific rigor and methods”
- Water Quality Standards



LEVEL 2

1. Evaluate effectiveness of pollution controls

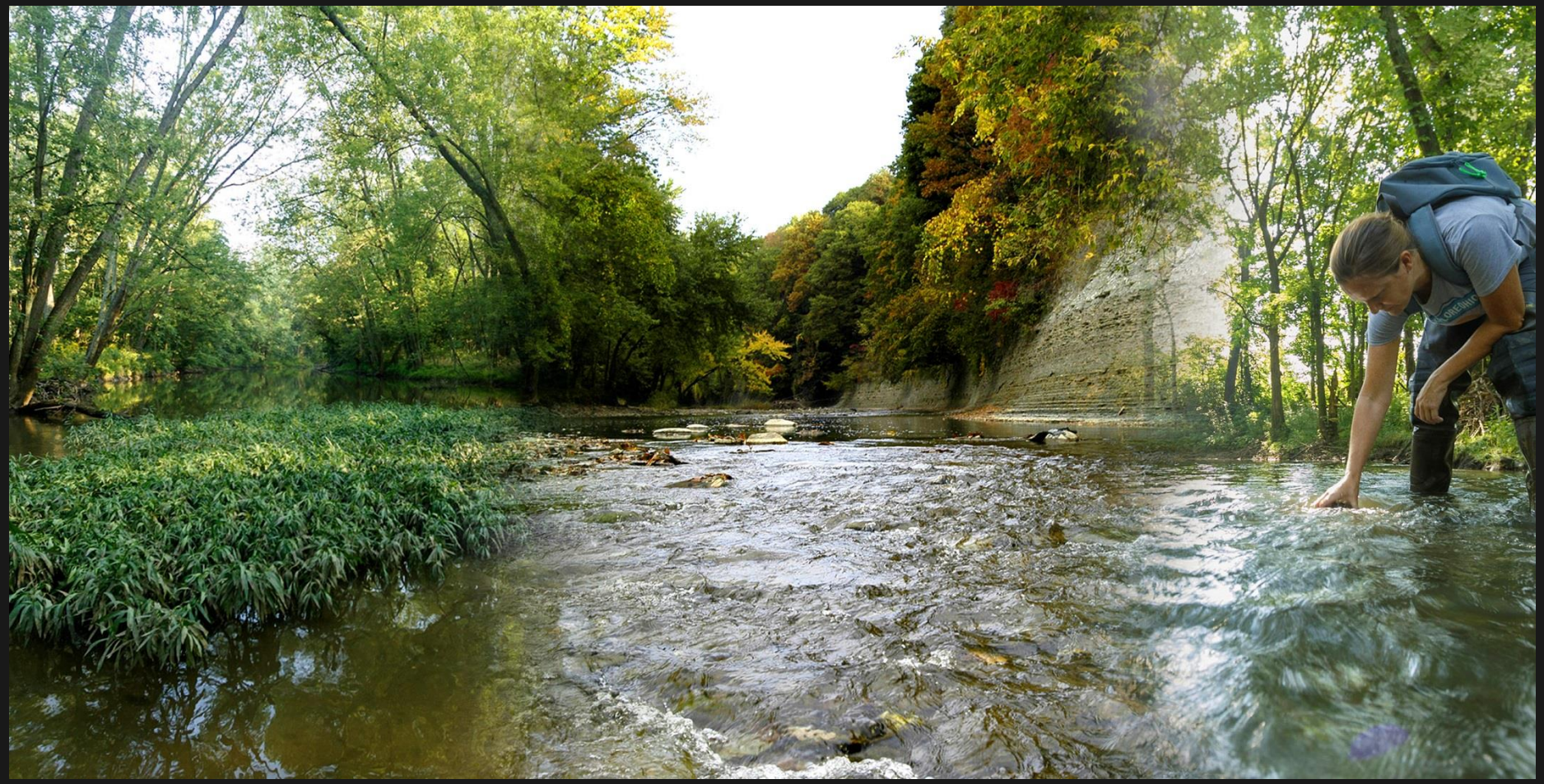
2. Conduct initial screening of water quality conditions

3. Promote public awareness and education

4. Long term water quality trends

LEVEL 1 vs LEVEL 2: Identification of Animals

LEVEL 1 VS LEVEL 2: MICROHABITATS



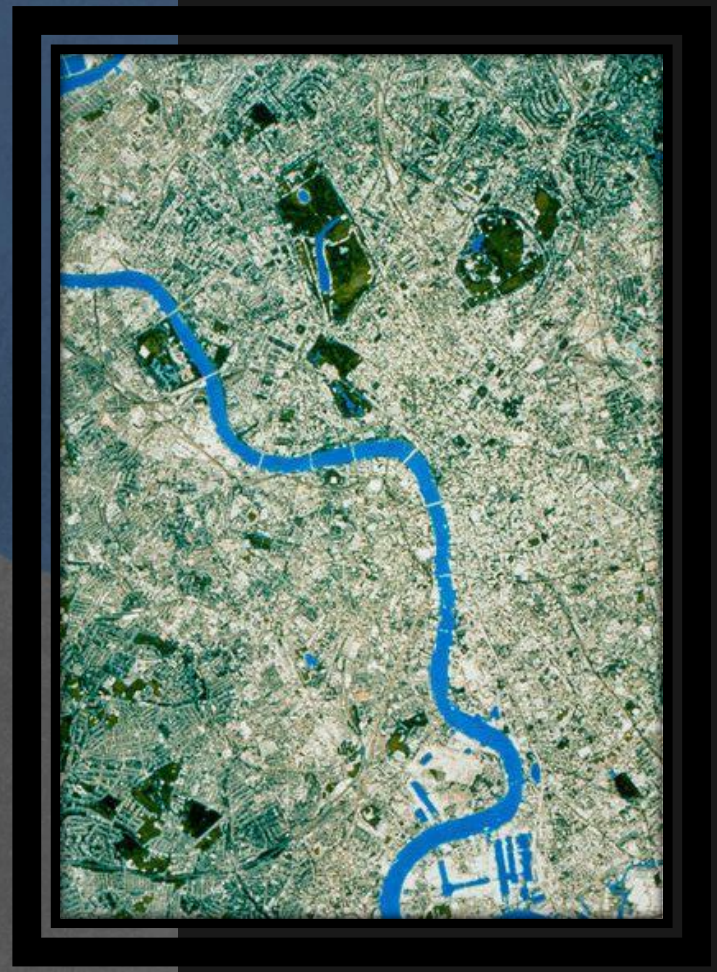
- Undercut banks
- Root Mats
- Shallows
- Leaf packs
- Clay and Silt

LEVEL 1 vs LEVEL 2: Training Requirements

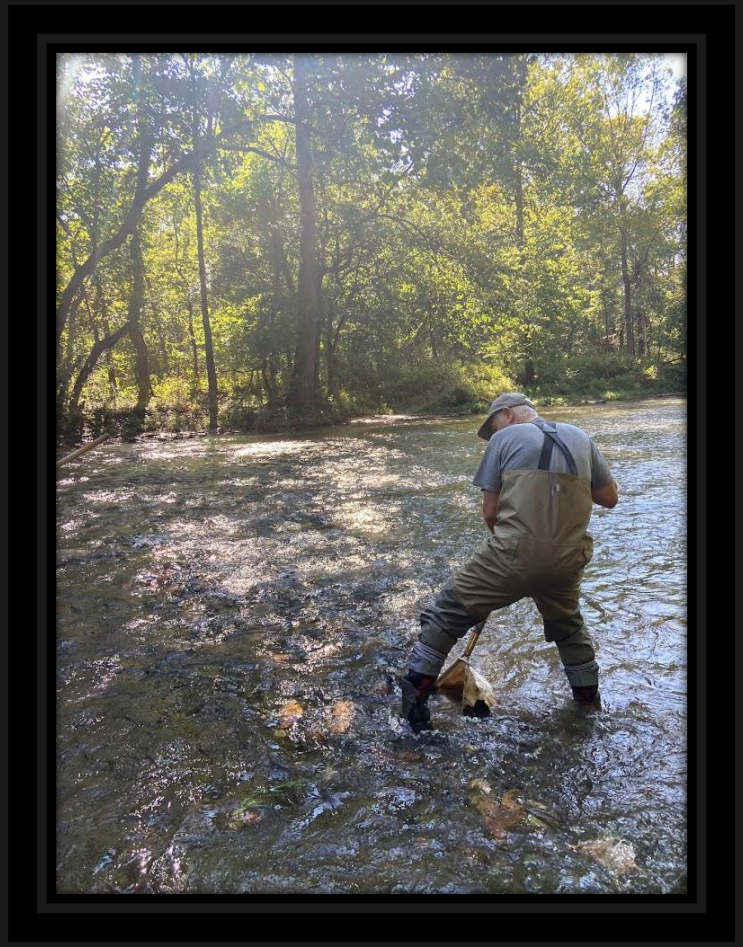
"Level of Confidence"

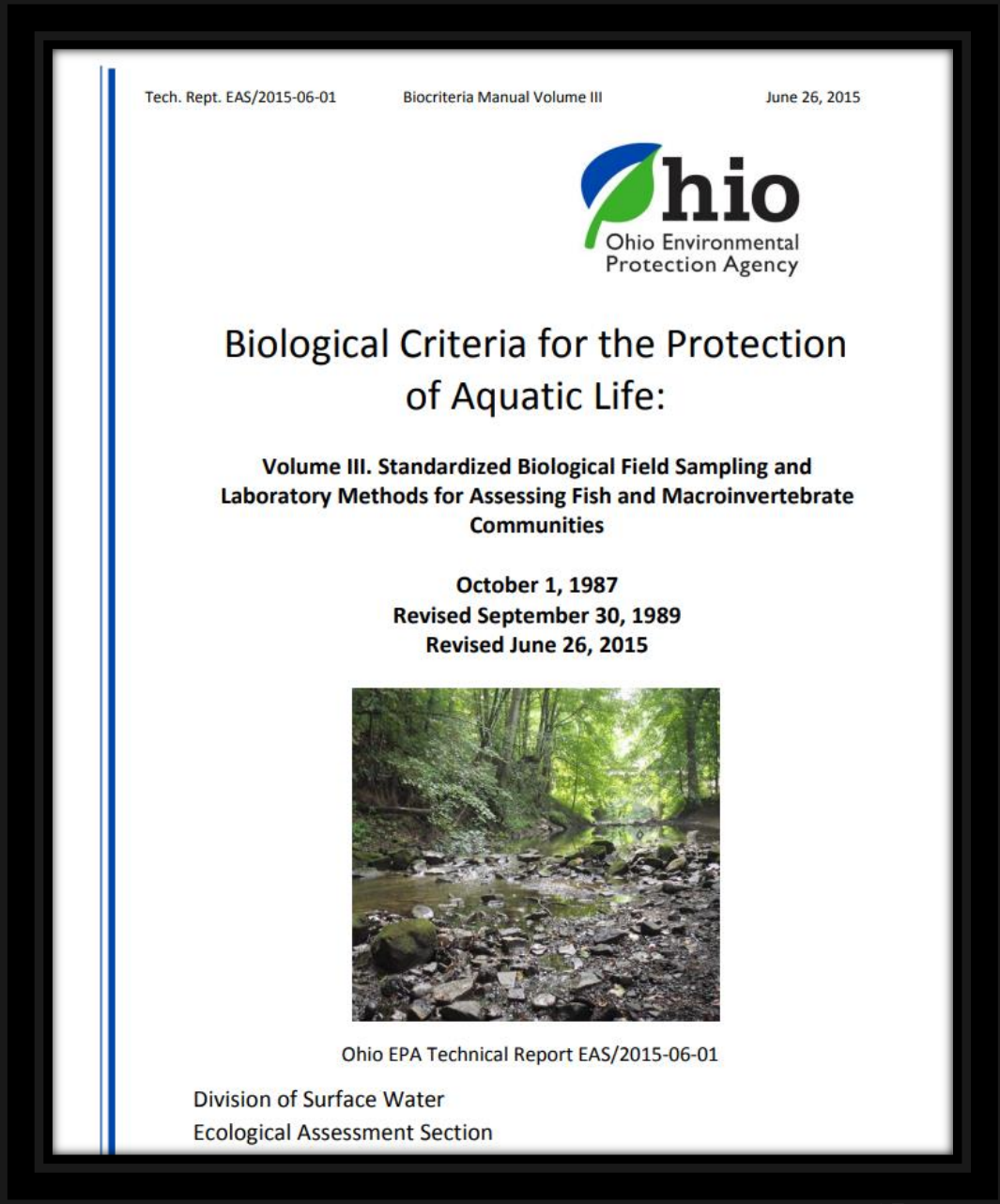
- ID Test
- Stream Knowledge
- Sampling Plans

Level 2: “Preliminary Insights”



NATURAL SUBSTRATE METHOD





Tech. Rept. EAS/2015-06-01 Biocriteria Manual Volume III June 26, 2015

Ohio Environmental Protection Agency

Biological Criteria for the Protection of Aquatic Life:

Volume III. Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities

October 1, 1987
Revised September 30, 1989
Revised June 26, 2015

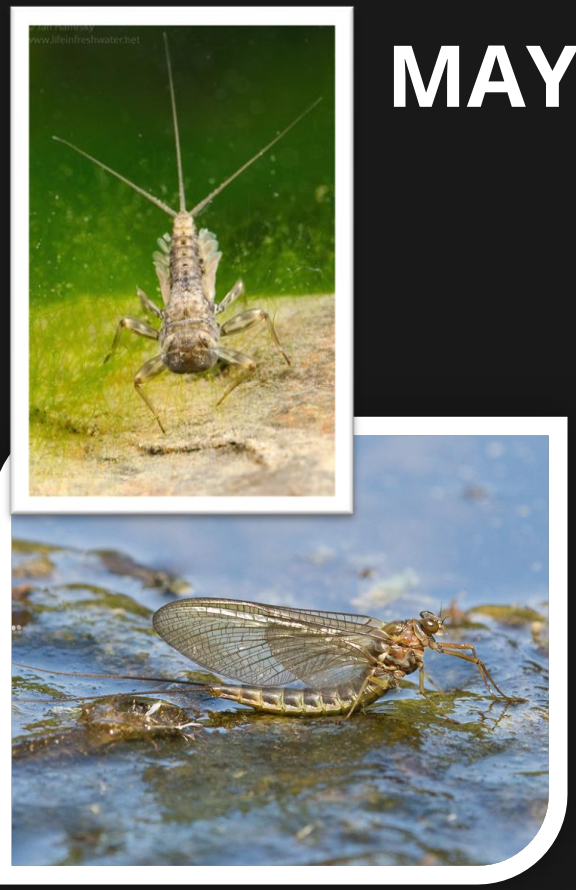
Division of Surface Water
Ecological Assessment Section

METHODS

- Macrohabitats
- 50-100 yards
- Hand-Pick
- Crew of 2: up to 90 minutes

EPT:
Ephemeroptera Plecoptera Trichoptera

MAYFLY



STONEFLY

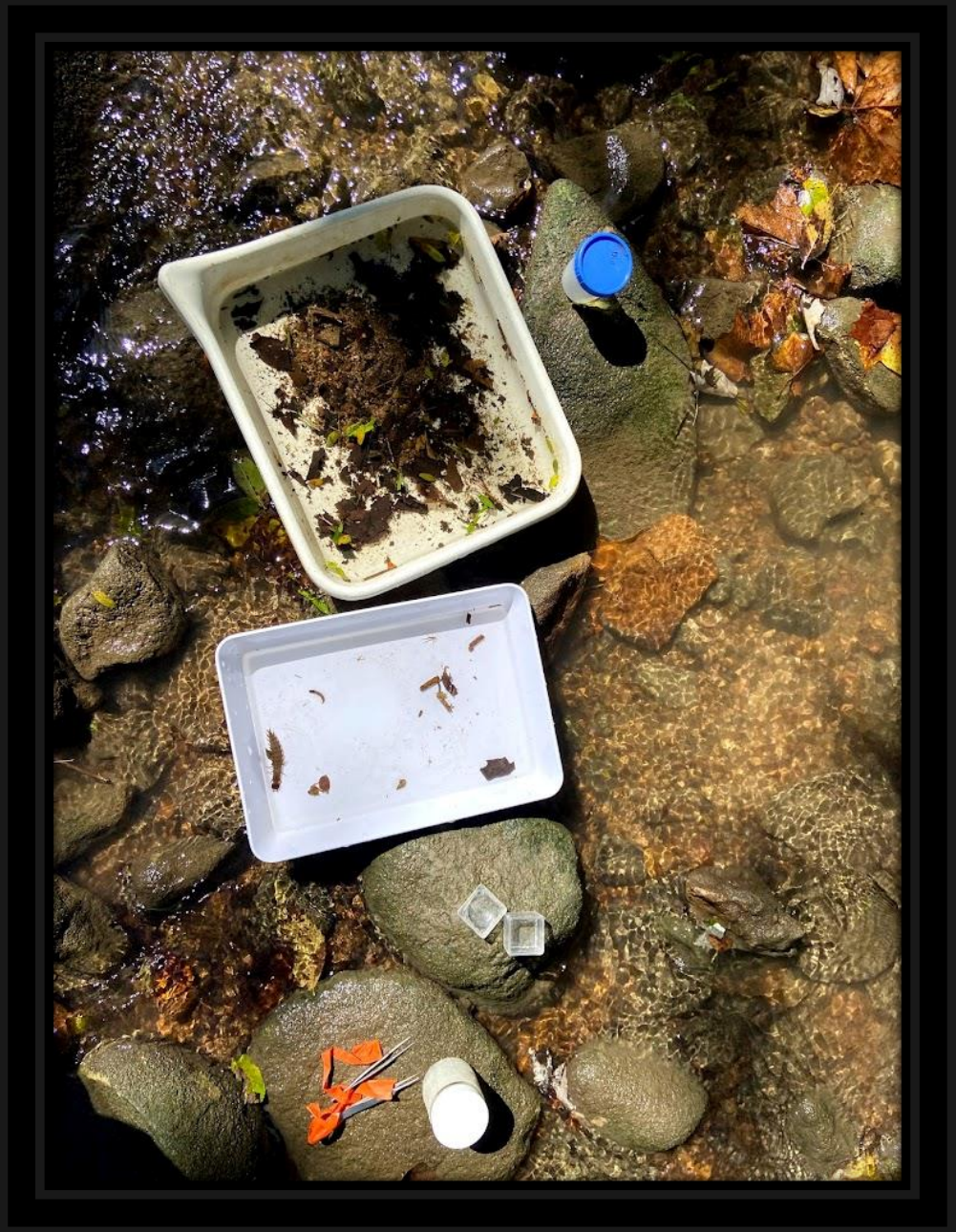
CADDISFLY

EPT FAMILIES: NATURAL SUBSTRATE METHOD

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	River	Date	Sample	SR Site	Size	Drainage (mi^2)	EcoRegion	Use	Qual EPT	EPT Score	Met EPT Expectatio	Attainment-All Metrics	Familes EPT	Emphemeroptera	Plecoptera	Trichoptera
6																
7	Olentangy	8/27/2003	79.7	0	Wading	39	ECBP	WWH	13	WWH	Yes	Partial	7	4	0	3
8	Olentangy	8/27/2003	74	0	Wading	50	ECBP	WWH	7	/= WWH	No	Partial	5	4	0	1
9	Olentangy	8/27/2003	68.1 (68)	0	Wading	58	ECBP	WWH	6	/=WWH	No	Non	5	4	0	1
10	Olentangy	8/28/2003	63.4 (63.5)	0	Wading	67	ECBP	WWH	2	/=WWH	No	Partial	2	1	0	1
11	Olentangy	8/29/2003	54.7	0	Wading	157	ECBP	WWH	19	EWH	Exceeds	Partial	11	4	0	7
12	Olentangy	8/29/2003	50.1 (50.3)	0	Wading	174	ECBP	WWH	20	EWH	Exceeds	Full	12	4	1	7
13	Olentangy	8/28/2003	45.5	0	Wading	181	ECBP	WWH	20	EWH	Exceeds	Full	13	6	1	6
14	Olentangy	9/8/2003	40.8 (41)	0	Sm. River	234	ECBP	WWH	15	WWH	Yes	Partial	7	4	0	3
15	Olentangy	9/11/2003	32.1	0	Sm. River	393	ECBP	WWH	10	/=WWH	No	Full	5	2	0	3
16	Olentangy	9/11/2003	28.2	31	Sm. River	410	ECBP	WWH	6	/=WWH	No	Partial	4	3	0	1
17	Olentangy	9/11/2003	27.5 (27.4)	0	Sm. River	411	ECBP	WWH	27	EWH	Exceeds	Full	16	7	1	8
18	Olentangy	9/11/2003	24.5	24.45	Sm. River	433	ECBP	WWH	21	EWH	Exceeds	Full	11	5	1	5
19	Olentangy	9/12/2003	19.5	19.7	Sm. River	459	ECBP	EWH	26	EWH	Yes	Partial	15	6	1	8
20	Olentangy	9/12/2003	14.9	14.55	Sm. River	482	ECBP	EWH	24	EWH	Yes	Full	14	5	1	8
21	Olentangy	9/12/2003	13.2	13.3	Sm. River		ECBP	EWH	24	EWH	Yes	Full	14	6	1	7
22	Olentangy	9/7/2004	7.8 (7.3)	0	Sm. River	519	ECBP	WWH	21	EWH	Exceeds	Full	15	6	1	8
23	Olentangy	9/7/2004	3.9 (4.0)	0	Sm. River	535	ECBP	WWH	20	EWH	Exceeds	Full	13	6	1	6
24	Olentangy	9/15/2003	3.9 (4.0)	0	Sm. River	535	ECBP	WWH	15	WWH	Yes	Full	9	4	1	4
25	Olentangy	9/16/2003	2.1	0	Sm. River	540	ECBP	*MWH*	1	/=WWH	No	Non	1	0	0	1
26	Olentangy	9/16/2003	1.8	0	Sm. River	540	ECBP	WWH	15	WWH	Yes	Partial	7	4	0	3
27	Olentangy	9/16/2003	0.6	0	Sm. River	543	ECBP	WWH	15	WWH	Yes	Full	9	6	0	3

APPLICABLE USE

- Track family presence/absence
- Collect data quickly
- Share data quickly



IDENTIFICATION

What's What and How to Know

3 B'S

WHAT TO LOOK FOR

Behavior

Breathing

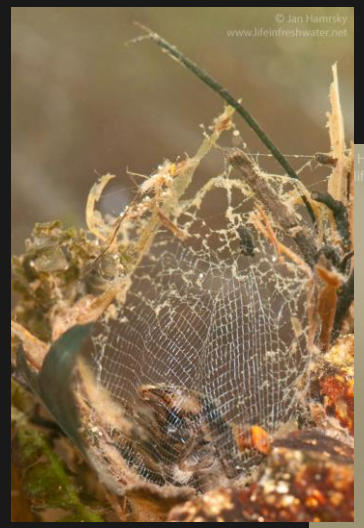
Backside

CADDISFLY

BEHAVIOR:
Slow crawler. Does not swim. Glue cases together with their silk.

BREATHING:
Through the skin. Some, like common netspinner, have branched gills on abdomen.

BACKSIDE:
Two tail hooks. May cling to net. Use hooks to pull themselves into backward crawl.



STONEFLY

BEHAVIOR:
Fast crawler with two-claws. Does pushups to circulate oxygen.

BREATHING:
Hair-like gills (not plated) usually near legs.

BACKSIDE:
Two long tails, not hooked.

MAYFLY

BEHAVIOR:
Most are swimmers and won't crawl on net, but flip like fish.

BREATHING:
Plate-like or feathery gills on sides of abdomen.

BACKSIDE:
Usually three tails, either thin and hair-like, or feathery. Some have two tails.

DOBSONFLY (HELLGRAMMITE)

BEHAVIOR:
Will crawl on net, or undulate body to swim backwards in water. Predator.

BREATHING:
8 pairs of puffy gills on underside of abdomen.

BACKSIDE:
Two strong tail hooks---like velcro. Holds them in riffle current and will pull themselves backward on net.

Macroinvertebrates.org

USGS

Approximate size!

RIFFLE BEETLE

BEHAVIOR:
Slow, little crawlers. Emerge and fly once after metamorphosis, then live their lives underwater.

BREATHING:
Visible gills in the larva. Adults can breathe underwater as long as habitat is oxygen-rich.

BACKSIDE:
Adults = no appendages
Larva = tufted white gills that they can retract into abdomen

University of Kentucky

WATER PENNY BEETLE LARVA

BEHAVIOR:
Slow crawlers, flattened onto surface, eating algae. Adults are semi-aquatic.

BREATHING:
Feathery gills underneath.

BACKSIDE:
No back appendages. Uniform appearance from above.

Macroinvertebrates.org

DRAGONFLY

BEHAVIOR:
Jet propulsion! Hinged jaws—ambush predators. Great clingers and crawlers.

BREATHING:
Internal gills.

BACKSIDE:
No longs tails, but have “spiky” ends

DAMSELFLY

BEHAVIOR:
Great clinger and crawler, predators. Can swim by waving body and using its gills as fins.

BREATHING:
Three paddle-shaped gills at end of abdomen, but can also breathe through skin.

BACKSIDE:
Three paddle-feathery gills.

TRUE FLIES

- No jointed legs as larvae
- Soft—no exoskeletons

Crane Fly

- Can flatten body to swim
- Backend appendages
- Will “nibble” on you
- Head isn’t visible

Midge Fly

- Distinct head
- No jointed legs, but has proleg “nubs” at front and/or back
- Otherwise, body is similar width throughout
- Can be a spastic wiggler on net

Black Fly

- Not uniform—bulbous end
- Head at thinner side
- Will attach with large end to your container and wave its body

CRUSTACEANS

- Opportunistic scavengers

Scud

- Sideswimming freshwater shrimp

Sowbug

- Similar to land-dwelling isopod: the rolly-polly/pillbug/potato bug

MOLLUSKS

SNAILS

BEHAVIOR: Algae scrapers

BREATHING:
Gilled--- dissolved oxygen in stream
Pouch--- can survive low oxygen in streams by storing air from in their “lunged” pouches

Left Opening= Lunged/Pouch

Right Opening= Gilled

CLAMS & MUSSELS

BEHAVIOR: Filter feeders through siphon

BREATHING:
Gills receive water from siphon, but also assist in moving food to the mouth, and providing temporary shelter and nourishment for larvae

All Mussel and Clam shells protected!

Mussel asymmetrical

Clam: symmetrical; generally small

WORMS


Aquatic Worm

- Similar to garden worms
- Slow mover
- Will tangle itself in the net
- No visible head or mouth


Flatworm

- Flat and soft, squishy body
- Does not swim
- Visible eyespots
- Often confused with leech—may lift its head off net


Leech

- Can swim well
- Two suckers, one on each end
- Flatter and more muscular than the other segmented worms
- Inch-worm movement by lifting head to investigate before pulling itself forward.

MOST ARE ENGULFER PREDATORS