

Supplement S2. Trait information for fish and macroinvertebrates used to calculate functional diversity

Organism C	Trait Cate	Trait	Trait Description
Fish	Trophic Ecc	NONFEED	Adults do not feed.
		BENTHIC	Benthic feeder.
		SURWCOL	Surface or water column feeder.
		ALGPHTO	Algae or phytoplankton, including filamentous algae.
		MACVASCL	Any part of macrophytes and vascular plants.
		DETRITUS	Detritus or unidentifiable vegetative matter.
		INVLFVSH	Aquatic and terrestrial invertebrates including zooplankton, insects, n
		FSHCRCRB	Larger fishes, crayfishes, crabs, frogs, etc.
		BLOOD	For parasitic lampreys that feed mainly on blood.
		EGGS	Eggs of fishes, frogs, etc.
		OTHER	Other diet components distinct from the preceding classes.
Body Size, I	A_1_1		Nonguarders; Open substratum spawners; Pelagophils.
		A_1_2	Nonguarders; Open substratum spawners; Litho-pelagophils.
		A_1_3A	Nonguarders; Open substratum spawners; Lithophils (rock-gravel).
		A_1_3B	Nonguarders; Open substratum spawners; Lithophils (gravel-sand).
		A_1_3C	Nonguarders; Open substratum spawners; Lithophils (silt-mud).
		A_1_4	Nonguarders; Open substratum spawners; Phyto-lithophils.
		A_1_5	Nonguarders; Open substratum spawners; Phytophils.
		A_1_6	Nonguarders; Open substratum spawners; Psammophils.
		A_2_3A	Nonguarders; Brood hiders; Lithophils (rock-gravel).
		A_2_3B	Nonguarders; Brood hiders; Lithophils (gravel-sand).
		A_2_3C	Nonguarders; Brood hiders; Lithophils (mud).
		A_2_4A	Nonguarders; Brood hiders; Speleophils (rock cavity).
		A_2_4C	Brood hiders; Speleophils (cavity generalist rock crevices, and also uni
		B_1_3A	Guarders; Substratum choosers; Lithophils
		B_1_4	Guarders; Substratum choosers; Phytophils.
		B_2_2	Guarders; Nest spawners; Polyphils.
		B_2_3A	Guarders; Nest spawners; Lithophils (rock-gravel).
		B_2_3B	Guarders; Nest spawners; Lithophils (rock-gravel).
		B_2_4	Guarders; Nest spawners; Lithophils (gravel-sand).
		B_2_5	Guarders; Nest spawners; Ariadnophils.
		B_2_6	Guarders; Nest spawners; Psammophils.
		B_2_7A	Guarders; Nest spawners; Speleophils (rock cavity/roof).
		B_2_7B	Guarders; Nest spawners; Speleophils (bottom burrows or natural hol
		B_2_7C	Guarders; Nest spawners; Speleophils (cavity generalist).
		C1_3_4_C2	A lumping of all bearers. May also be regarded as substrate-indifferer
Habitat Pre	MUCK		Muck substrate.
		CLAYSILT	Clay or silt substrate.
		SAND	Sand substrate.
		GRAVEL	Gravel substrate.
		COBBLE	Cobble or pebble substrate.
		BOULDER	Boulder substrate.
		BEDROCK	Bedrock substrate.
		VEGETAT	Aquatic vegetation.
		DEBRDETR	Organic debris or detrital substrate.

LWD Large woody debris.  
 PELAGIC Open water.  
 PREFLOT Lotic and lentic systems but more often in lotic.  
 PREFLEN Lotic and lentic systems but more often in lentic.  
 POTANADR Potamodromous or anadromous. Species that exhibit significant movement.  
 LACUSTRIN Lentic systems.  
 LOWLAND Lowland elevation.  
 UPLAND Highland elevation.  
 MONTANE Mountainous physiography.  
 LARGERIV Medium to large river.  
 SMALLRIV Stream to small river.  
 SPRGSUBT Spring or subterranean water  
 CREEK Creek.  
 SLOWCURR Slow current.  
 MODCURR Moderate current.  
 FASTCURR Fast current.

Macroinvertebrate Life history  
 Voltinism 1 Semivoltine (.1 generation/y)  
 Voltinism 2 Univoltine (1 generation/y)  
 Voltinism 3 Bi- or multivoltine (.1 generation/y)  
 Development Fast seasonal  
 Development Slow seasonal  
 Development Nonseasonal  
 Synchronization Poorly synchronized (wk)  
 Synchronization Well synchronized (d)  
 Adult life span Very short (.1 wk)  
 Adult life span Short (.1 mo)  
 Adult life span Long (.1 mo)  
 Adult ability Absent (not including emergence)  
 Adult ability Present  
 Ability to swim Absent  
 Ability to swim Present  
 Mobility  
 Female dispersal Low (.1 km flight before laying eggs)  
 Female dispersal High (.1 km flight before laying eggs)  
 Adult flying Weak (e.g., cannot fly into light breeze)  
 Adult flying Strong  
 Occurrence Rare (catastrophic only)  
 Occurrence Common (typically observed)  
 Occurrence Abundant (dominant in drift samples)  
 Maximum current Very low (.10 cm/h)  
 Maximum current Low (.100 cm/h)  
 Maximum current High (.100 cm/h)  
 Swimming None  
 Swimming Weak  
 Swimming Strong  
 Morphology Attachment None (free-ranging)  
 Attachment Some (sessile, sedentary)  
 Attachment Both

	Armoring 1	None (soft-bodied forms)
	Armoring 2	Poor (heavily sclerotized)
	Armoring 3	Good (e.g., some cased caddisflies)
	Shape 1	Streamlined (flat, fusiform)
	Shape 2	Not streamlined (cylindrical, round, or bluff)
	Respiration	Tegument
	Respiration	Gills
	Respiration	Plastron, spiracle (aerial)
	Size at mat	Small (<9 mm)
	Size at mat	Medium (9–16 mm)
	Size at mat	Large (>16 mm)
Ecology	Rheophily 1	Depositional only
	Rheophily 2	Depositional and erosional
	Rheophily 3	Erosional
	Thermal preference	Cold stenothermal or cool eurythermal
	Thermal preference	Cool/warm eurythermal
	Thermal preference	Warm eurythermal
	Habit 1	Burrow
	Habit 2	Climb
	Habit 3	Srawl
	Habit 4	Cling
	Habit 5	Swim
	Habit 6	Skate
	Trophic habit	Collector-gatherer
	Trophic habit	Collector-filterer
	Trophic habit	Herbivore (scraper, piercer, and shedder)
	Trophic habit	Predator (piercer and engulfer)
	Trophic habit	Shredder (detritivore)



ement related to spawning. We concentrated on movements between marine and freshwater or within f





freshwater from large river, reservoirs, or lakes to tributary streams.